Report on Egg Solids

SEPTEMBER 1955

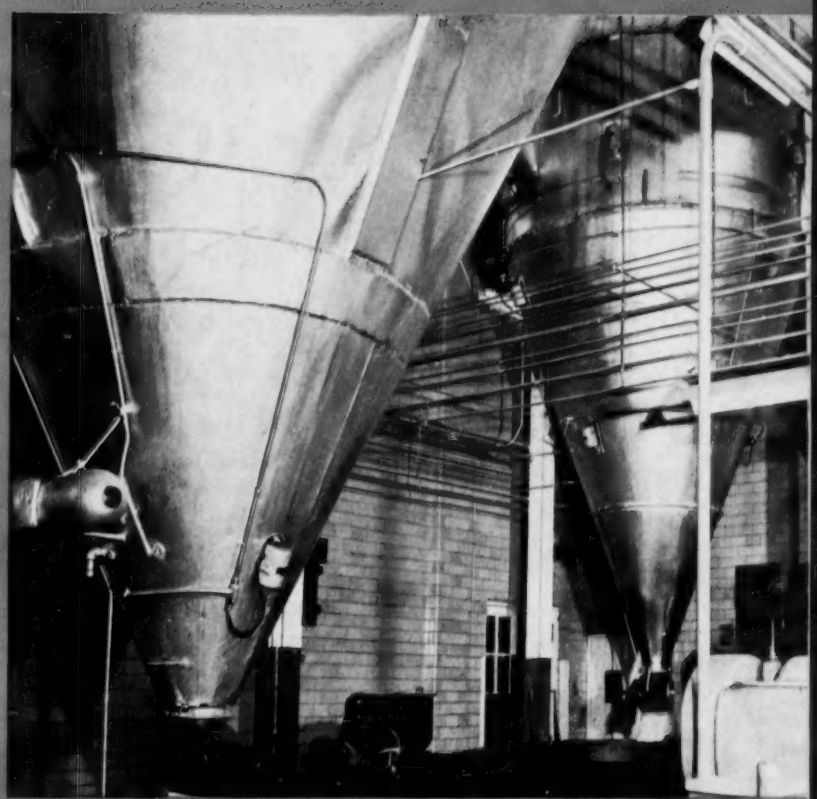
35 CENTS

FOOD ENGINEERING

A McGRAW-HILL PUBLICATION

TRANSPORTATION • Super-frozen foods shipped without refrigeration. p. 65

INGREDIENTS • New leavening agent remains inactive until it is heated. p. 59



PROCESSING • Big strides in spray-drying yield better egg solids, tailored to their purposes, and convenient to use. p. 77

ALSO: ENGINEERING • PERSONNEL • MAINTENANCE
MATERIALS HANDLING • PRODUCTS • QUALITY CONTROL
INSTRUMENTS • PACKAGING • SANITATION

. . . See Contents Classified by Subject, Page 3 ➡

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SEPTEMBER 1955

Volume 27 Number 9

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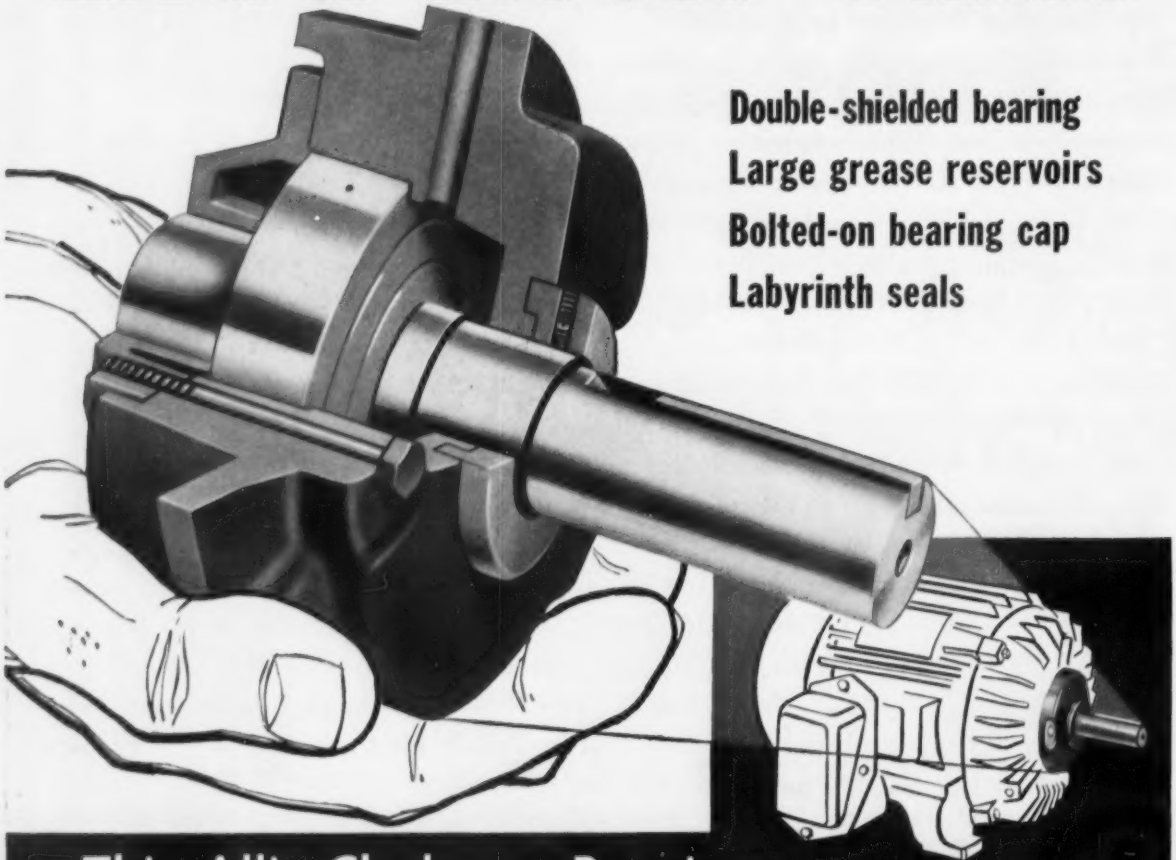
Here Is Extra Motor Value



Double-shielded bearing
Large grease reservoirs
Bolted-on bearing cap
Labyrinth seals

This Allis-Chalmers Bearing Design Gives More for Your Motor Dollar

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

You can lubricate these bearings without dismantling motor. Pipe-tapped holes in the bearing housings at two points provide means for inserting new grease, flushing out old grease and of relieving pressure during re-greasing.

Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7225.

A-4616

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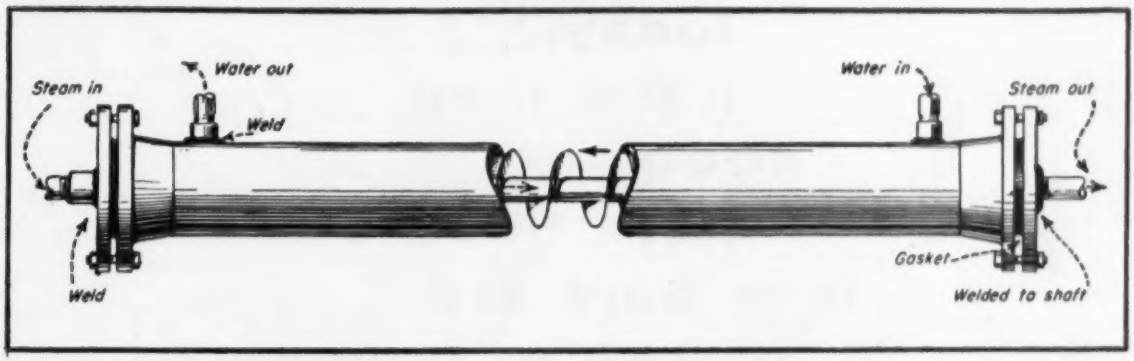
PRACTICAL IDEAS



Combination Heater Muffler

In one of our plants a double problem was solved through development of a single simple device.

Here is the first problem.

In use was a reciprocating steam pump which exhausted steam outside the plant through an opening in the wall. Not only did the large cloud of condensed steam present a problem, but exhaust also created a noise nuisance. When the engine exhaust was returned to feed water heater, the oil in the exhaust steam gave boiler trouble even though an oil separator was used.

Second problem faced was lack of an adequate steady supply of warm water which was required for rinsing centrifuged lactose.

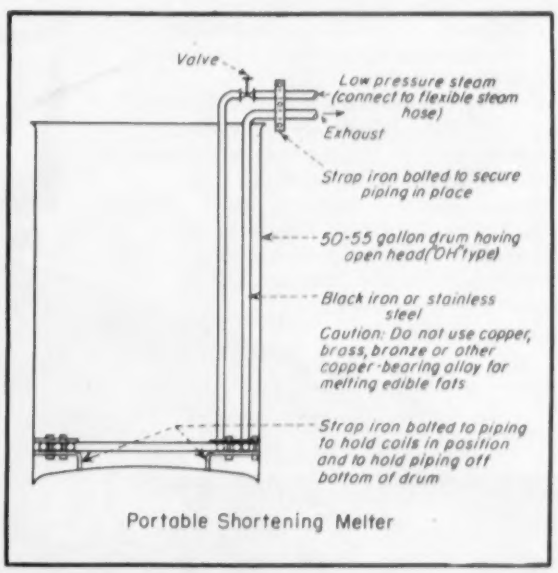
This is how both problems were solved with a unit fabricated from discarded pieces of equipment.

What was actually accomplished was the conversion of an old screw conveyor from the scrap heap into a heat exchanger. Hollow shaft of the screw fortunately was the same pipe size as the exhaust line from a steam engine to which it could readily be attached. Screw flights were first trimmed down so that a pipe of large diameter could be slipped over them. Then end flanges for this case were made by cutting holes in blind flanges, one hole large enough for screw shaft, and the other large enough for a coupling threaded onto one end of the hollow shaft.

Here's how the unit is assembled. Flange with coupling is screwed onto the short threaded end of shaft. Then the screw is inserted into the cylinder and flange then bolted into place. Next step is to slip the flange over the other end of shaft and bolt it in place. Finally the shaft is welded to the last flange. If ever necessary the unit can be disassembled by unscrewing the flange with the coupling from the shaft and slipping the screw out of the cylinder.

Finally the assembled unit was piped so that exhaust steam from the engine passed through the shaft and also so that water for rinsing was piped counter-currently around the flights. Both the objectionable steam cloud and noise were eliminated and, at the same time, a sufficient amount of warm water was provided necessary for the clean-up operation.

The straight path for the steam exhausting through the heat exchanger kept the shaft purged of oil thereby allowing efficient heat transfer rate. In addition the flights welded to the shaft added to the heat transfer surface as well as increased the velocity of the water during the heating operation.—*Joe A. Maldari, Manager, Engineering Dept., Western Condensing Co., Appleton, Wis.*


Valve
Low pressure steam (connect to flexible steam hose)
Exhaust
Strap iron bolted to secure piping in place
50-55 gallon drum having open head (DH type)
Black iron or stainless steel
Caution: Do not use copper, brass, bronze or other copper-bearing alloy for melting edible fats
Strap iron bolted to piping to hold coils in position and to hold piping off bottom of drum

Portable Shortening Melter

Movable Melter for Shortening

This simple pipe assembly, which may be constructed at low cost in the maintenance or pipefitter shop, will increase the speed of melting shortening.

The resulting unit does an efficient job of melting fats, tallow, lard, or any other low-to-medium melting point materials for use in various food plants. The melted material may be drawn off through a pipe and valve or bung at-

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(Formerly Food Industries)

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Originated by General American in 1944

today, more than 4000 GATX flued-dome tank cars are leased to industry

Back in 1944, General American's research department completed development of a way to make tank cars easier to line, add structural strength, simplify cleaning, and minimize corrosion. This revolutionary development . . . the *flued-dome* tank car . . . was immediately accepted by railroads and shippers.

Now, eleven years later, U. S. railroads haul GATX *flued-dome* cars everywhere carrying products ranging from ammonium nitrate to hydrogen peroxide . . . from glucose to latex . . . from muriatic to sulfuric acid. The GATX *flued-dome* car was another of the many innovations pioneered by General American . . . leader in tank car design.

Another rail shipping success!

The aluminum tank car is typical of the more than 4000 *flued-dome* cars in the GATX fleet. There are over 200 different types in the fleet . . . designed, built and operated by General American—all leased to industry without capital investment.

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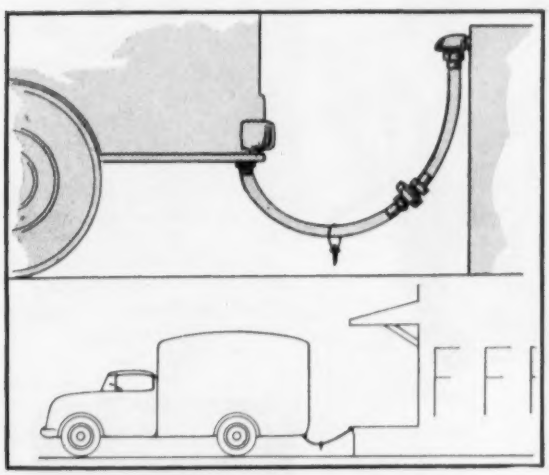
tached to the bottom or end outlet of the container, or it may be pumped out.

This is how the assembly operates: The head is removed from a drum containing shortening and the coil placed above the material to be melted. Then the steam is applied and the coil sinks to the bottom of the drum. Heating is continued until the entire contents is melted and warmed to the desired temperature.

Using this device avoids the need to remove materials from the original shipping container, thus saving labor and time.

When fats are purchased in 50 lb. packages, the melting drum may be placed permanently in a convenient location and the 50 lb. blocks of fat then loaded in manually for melting.

When desirable a portable mixer may be attached to the side of the drum to provide mixing facilities for incorporating minor ingredients.—*T. H. Barnard, Clinton Foods, Inc., Clinton, Iowa. (Editor's note: Through an error in layout, the sketch above incorrectly appeared with another Practical Idea on p. 13 of June FE.)*



Truck Refrigerating Losses Ended

Truck fleet operators who utilize cold plate and similar types of ammonia refrigeration systems can eliminate a serious profit loss through a simple innovation developed by a food manufacturer in Fort Worth, Texas.

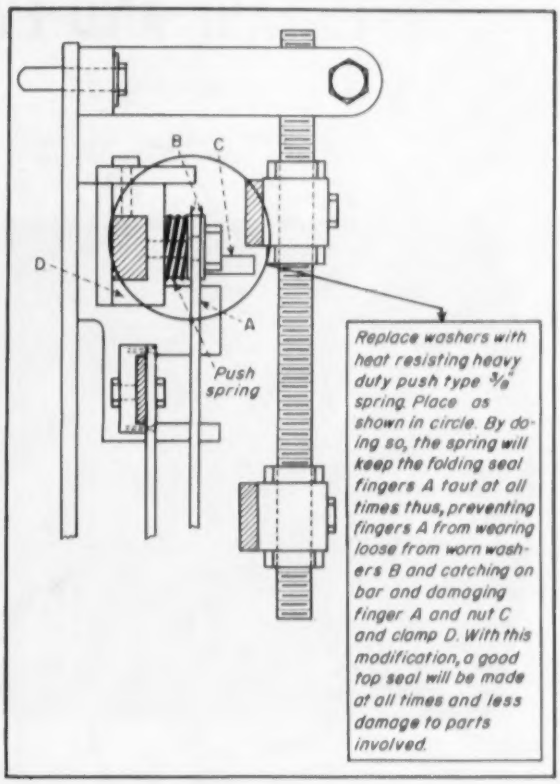
This company, which operates more than 75 refrigerator trucks, experienced a constantly annoying source of loss due to driver's pulling away from the refrigeration dock without detaching the heavy charging lines which provide low temperatures in the truck cold plates.

To end these losses driver meetings were held to discuss the problem and warn the drivers. Bulletins were distributed and signs were posted to aid drivers in remembering to check carefully before leaving their dock positions. Nevertheless the damage continued, resulting in torn hoses, stripped coupling threads and often a wholesale loss of refrigerant fluid. Finally a supervisor of the truck fleet came up with a simple idea which fully solved the problem.

This is how it was done.

Ignition keys of every truck were attached to a heavy brass wire ring, each one 3½ in. in dia. Drivers are now instructed to keep the key always on the ring, leaving it in the ignition switch when parking the truck for the night's refrigeration charge.

Before hooking up the refrigerant lines, service men now remove the key from the ignition, slip it over the truck extension hose before battening down the brass coupling. Suspended thus on the hose the key cannot be removed for placement in the truck ignition system until the driver has first disconnected the valve-coupling, on the refrigeration line. In this way nothing is left to chance and the damage problem has been reduced to a negligible factor.—*Robert Latimer, Denver, Colorado.*


B
C
D
A
Push spring
Replace washers with heat resisting heavy duty push type 3/8" spring. Place as shown in circle. By doing so, the spring will keep the folding seal fingers A taut at all times thus, preventing fingers A from wearing loose from worn washers B and catching on bar and damaging finger A and nut C and clamp D. With this modification, a good top seal will be made at all times and less damage to parts involved.

Spring Aids Performance

Certain washers on our cellophane bag making, filling, and closing machine frequently became worn after a short period of time. When this happened the folding fingers would flop in every direction, catching on other parts of the machine. Result was a very unsatisfactory package fold.

We replaced the washers with case-hardened washers supported by a short, stout, heat-resisting ⅜ in. spring (see sketch). This has kept the fingers taut at all times to assure a much more satisfactory top seal.—*H. D. Loucks, Jonesboro, Ark.*

Steam-Out Saves and Speeds

In our factory for making milk-powder, butter, and processed cheese at Gotene, Sweden, we use daily for the production of butter about 30,000 liters of cream with a fat content of about 40%. This cream is sent to us in stainless steel tanks on lorries. Tanks hold from 1,000 to 2,500 liters each.

When the cream is pumped from these tanks into the stationary tanks in the factory, there remains on the inside walls of the transportable tanks a layer of cream-skim (and when it is very cold, also some frozen cream).

In order to remove this layer and avoid losses of fat we previously used to wash with 20 to 50 liters of water per emptied tank. This was not very effective and, moreover, it increased the quantity of churn-milk, with which

Only UNIFORMLY CONTROLLED CAN AGITATION GIVES FAST AND EVEN HEAT PENETRATION

Compare!

Conventional non-agitation type cooking, where heating is by *conduction*, is both slow and uneven. This type of cooking makes it necessary to overheat the product at the can's periphery in order to reach sterility at the center of the can. As a result, complete uniformity of product quality within the can is seldom possible.

This superior Quality Control has made FMC "Sterilmatic"* the standard of processing equipment for finer canned foods

Within the "Sterilmatic" Continuous Pressure Cooker every can is cooked *evenly* and *exactly alike* through the combination of individual can rotation and agitation of the product within the can. Of course this rolling agitation and the consequent "basting" action depends on the consistency of the product. But the important point is that this is *induced convection heating*, which increases the rate of heat penetration, keeps cooking absolutely uniform, provides for the precise processing control you need to maintain consistently high standards of product quality.

When you compare the process and compare the results, you'll sooner or later replace with an FMC "Sterilmatic" Continuous Pressure Cooker and Cooler. So write today for full information, or call your nearest FMC representative.

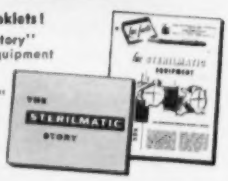
NOTE: For products requiring very little agitation a special type of reel and spiral mechanism is provided.

*Trade Mark — Reg. U. S. Pat. Off.

Write for free booklets!

"The Sterilmatic Story" shows what this equipment can do for your operations.

"Sterilmatic Facts" includes all technical data and specifications of equipment.



FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

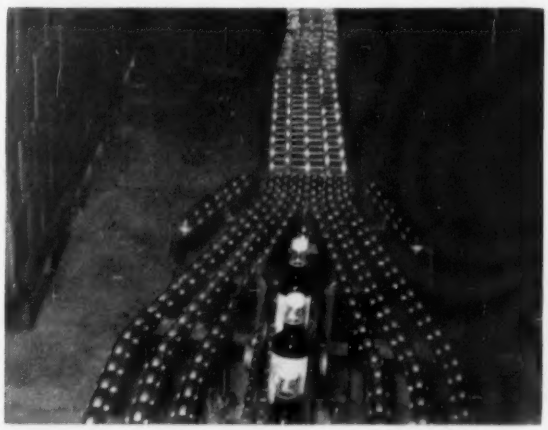
General Sales Offices:

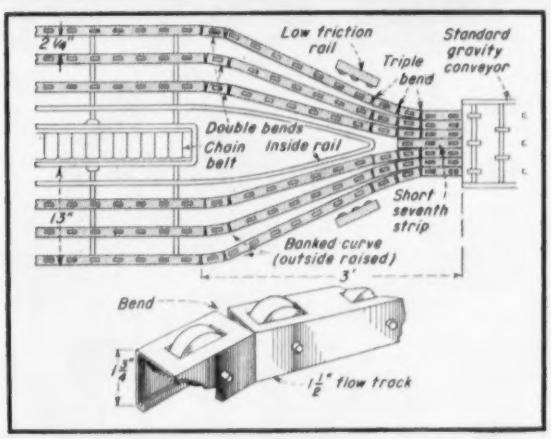
WESTERN: SAN JOSE, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS

a certain amount of costly butterfat would be lost.

We have now found that if, while the transport tank is being emptied, we insert a steam-hose through the manhole and fill the tank with steam, the skim-layer is rapidly melted down and the inside walls of the tank are cleaned. This reduces fat-losses to a minimum and facilitates considerably later cleaning of the tank. Finally, fat-losses through excess of churn-milk are also less.

With this method we save about one pound of butter-fat per tank (about 20 pounds a day), or to us about 25,000 Swedish Crowns a year.—*V. Hall, Skaraborgs Lans Dairy Association, Gotene, Sweden.*





Fabricates Converging Conveyor

Our maintenance department constructed an efficient device for conveyor converging to facilitate operations at the discharge end of our high-speed bottling line, which is fully automatic except for the hand operation of case packing.

The line requires a packer at each side of the bottle conveyor, therefore, the filled cases must ultimately all run on a single conveyor for warehouse processing. So far as we are aware there are no stock converging conveyors capable of merging two narrowly spaced parallel conveyor lines.

Our major problem was to enable case packers to stand close to the bottle conveyor. This ruled out the use of standard gravity conveyors. However, it was necessary to have the two lines merge into a regular gravity conveyor. Furthermore the two lines were only eleven inches apart thus making use of "S" shaped stock conveyors impossible. And lastly, the length of converging members was important since space, as usual, was a factor.

The converging section of the conveyors (see photo) we fabricated is only three feet long and was constructed with unit strips of roller conveyor called flow track. Three strips are mounted on each side of the bottle conveyor and spaced 2¼ in. apart (see sketch).

These conveyors are so bent as to merge at discharge area into six parallel strips one inch apart.

In order to provide a banked curve, the outer roller strips are slightly elevated. As a result we have found that the cases follow the conveyor curves very truly.

When we had constructed this portion of the assembly we had two small strips of conveyor left, but found excellent use for them as guide rails at the converging section, where they form almost frictionless rails. Though they may not always be necessary they do serve as a safety precaution should a case travel too fast.

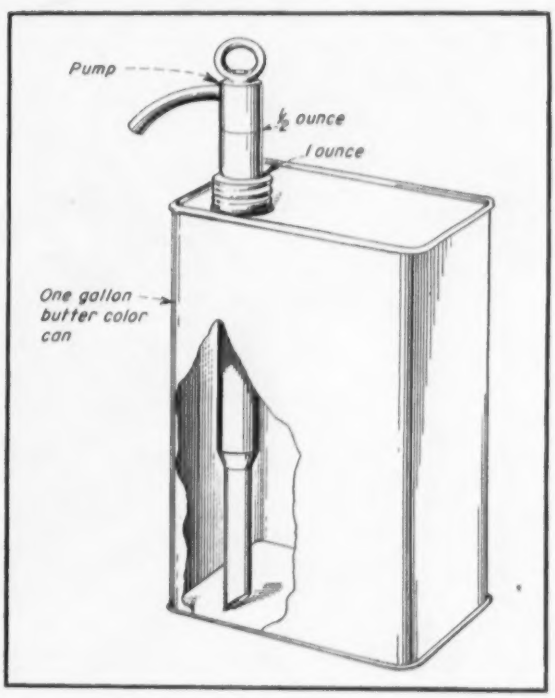
At the point of merging with the stock gravity conveyor, a short seventh strip is mounted between the converging sections.

Here are a few construction suggestions.

The strips of conveyor are easily bent by burning or cutting through the top and one side of the strip. After bending to the proper position, the cut section is lightly tacked (spot welded).

In our installation each strip has two bends at the start of convergence and three bends at the end of convergence.

Since its installation, the system has proved to be absolutely trouble-free, so much so that we have made it standard for our other converging lines.—*Horace A. Greene, Recipe Foods, Inc., Baltimore, Md.*



Dispenses Food Color

To eliminate mess and a possible source of contamination in using liquid butter color, we have adapted a plastic pump to the gallon cans the color comes in, calibrated so a stroke delivers either 1 oz. or ½ oz. of color.

We adapted an empty color can to fit the pump since the screw top on the color can was too small to accommodate it. This makes it necessary to pour all the color from

If you use MILK or

N.F.D.M.S.

...see how

Sweet Dairy Whey

can improve quality and reduce costs TOO!

SWEET DAIRY WHEY is an improved dairy ingredient that perfects the richness of "old-fashioned flavor" in modern food preparations. It improves color, texture, shelf-life and appearance of food products. And it can save you money too — up to 50% of your dairy ingredient costs — by replacing part or all of your present dairy solids.

If you use milk, or nonfat milk products, it will pay you to investigate Sweet Dairy Whey. It's spray dried, meets or exceeds U. S. Extra Grade standard. In addition to extensive use in the baking and meat industries, here are just a few of the ways Sweet Dairy Whey is being used to improve food products today:

Sherbet — for better control over texture, appearance, flavor. Reduces flavoring costs, too.

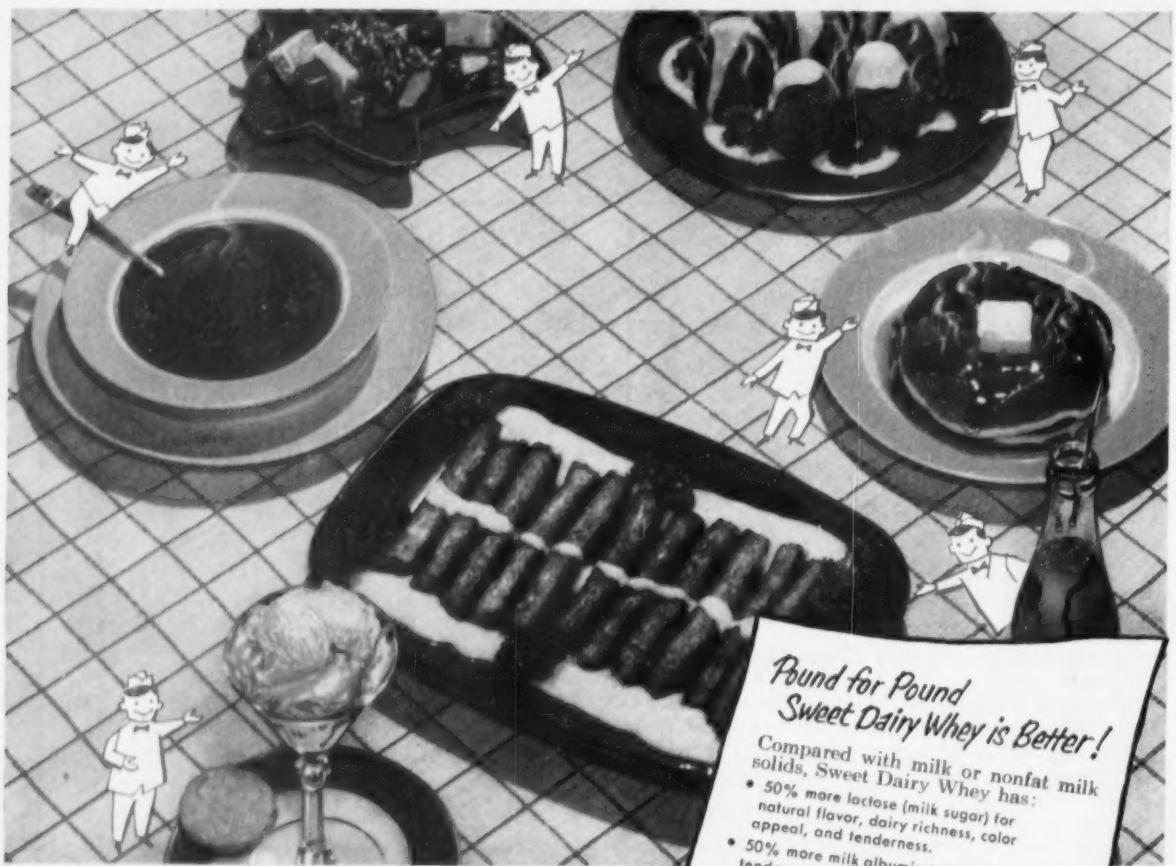
Candy — Sweet Dairy Whey preserves natural fresh flavor, texture and sweetness longer . . . provides superior eating qualities.

Cream-style foods — for smoother heavy-bodied cream soups and sauces with natural flavor. Improved reconstituting qualities.

Tomato soups — for greater heat stability, more original tomato taste and no separation before or after sterilization.

Prepared mixes and batters — for richer, golden-brown color, appealing milk flavor, and for tender, fluffy texture.

Soft drinks — for improving body characteristics in fruit juice type drinks . . . helps achieve proper "cloudiness" effect.



Pound for Pound Sweet Dairy Whey is Better!

Compared with milk or nonfat milk solids, Sweet Dairy Whey has:

- 50% more lactose (milk sugar) for natural flavor, dairy richness, color appeal, and tenderness.
- 50% more milk albumin to keep food tender, moist, fresh — longer.
- 25-50% lower cost . . . plus more of the essential milk constituents, more milk minerals and B-complex vitamins. And it's casein free!
- Uniform quality the year around. Prompt delivery.

Write Technical Service Department for additional information and working samples

Sweet Dairy Whey

"A VALLEY FRESH PRODUCT"

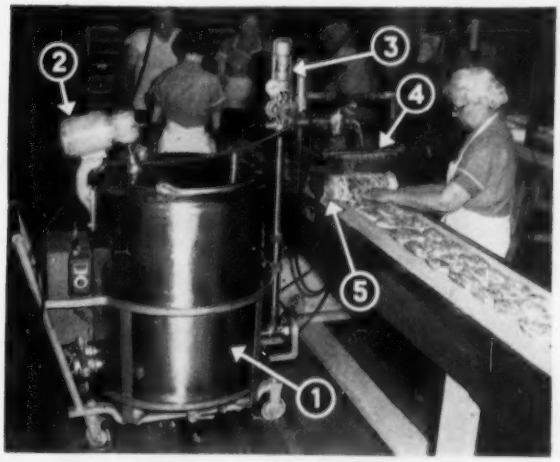
WESTERN CONDENSING COMPANY
APPLETON, WISCONSIN
World's Largest Producer of Whey Products

32 plants coast-to-coast

the original container into this can in order to use the pump dispenser. However, it is well worth the effort.

We now pump the color direct from the can to the churn thereby eliminating the messy measuring cup or graduate that had to be washed and sterilized every time it was used. We have eliminated errors in measuring and also the wasted color that adhered to the cup.

Never before has our color been as uniform from churning to churning as it is now.—*Henry Griep, Arlington Creamery Association, Arlington, Minnesota.*



Air Pump Speeds Icing Operation

One thousand sweet rolls per hour is the standard of performance for new icing system devised by a large New England baking company.

Rolls are iced in assembly line style by an almost entirely-mechanical operation which not only eliminates hand application, but also speeds production.

Key to the system is a stainless steel, portable icing tank–(1) in photo–known as a Rollaway Univat, with an air pump connection.

The tank has stainless steel water jacket and is equipped with two-7½ kw electric heating units, thermostatic control and mechanical stainless steel agitator. The 600 lb capacity unit is mounted on a Rollaway truck.

Vessel is filled in icing make-up room and then easily rolled on its free-running wheels to point of application. When in position, the electric heaters and agitator are started, to automatically bring icing up to an even 140 F. in a short time. The agitator paddle, driven slowly by a ¼ hp motor (2) mounted at the top of the tank, serves to prevent settling out and creaming, and keeps the temperature of the entire batch uniform.

Bottom of vessel slopes down to an 1½" outlet at one side where an Alemite Air Pump (3) is connected to draw off icing at 25 pounds pressure and push it up through a length of plastic tubing into a one-inch stainless steel distributor pipe (4) mounted directly above a conveyor belt. The warm icing flows downward through holes in the distributor pipe and falls upon a roller (5) located directly over the conveyor. This roller is constructed of foam rubber and covered with a very loose-fitting polyethylene sleeve.

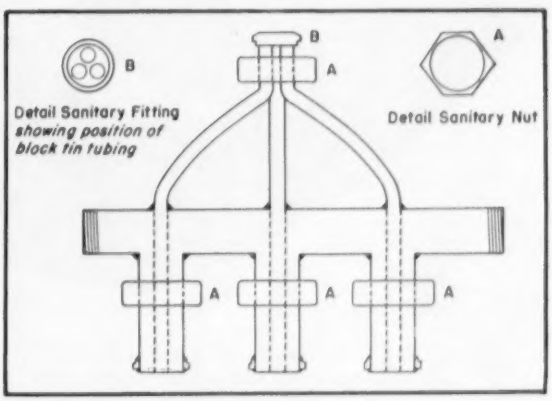
A continuous line of rolls, three abreast, passes under the roller to receive from it a generous coating of icing.

The loose-fitting polyethylene sleeve, with its twists and wrinkles, imparts a desired hand-iced appearance to the rolls, in that the coating of icing is never too uniform.

With different distributor and tooler, this same set-up, is used to ice hot cross buns. Buns receive a single ribbon of icing–then they are turned at right angles to a system of conveyors and pass under a second tooler to receive a second ribbon of icing and this forms the cross. Both distributors are fed from the same pump. The vat and air pump combination is also used to ice cakes and cupcakes.

Big advantage gained with the system is the absence of pressure on the icing in the tank. Bulky, costly pressurized tanks are hard to move, take up more space and are more difficult to clean. There is also a danger of leaks, which cause delays, loss of icing and make floors messy.

According to the bakery portability of unit is another important feature, since it can be moved easily around the plant for filling, application and cleaning in the rooms where these jobs can best be done. Of polished stainless steel construction, it can be easily cleaned and kept sanitary.—*Cherry-Burrell Corporation, Chicago.*



Device for Adding Flavor

Here is a practical device for the incorporation of marshmallow into chocolate nut ice cream to make it into a Rocky Road ice cream. The marshmallow header (see sketch) fits onto an Ex-Cell-O Pure Pak pint and quart packaging machine. The marshmallow is forced through

CAN YOU USE $50?

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Send one of your ideas to FOOD ENGINEERING.

Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in twelve.

Also $5 to $15 is paid for each contributed item used. So a few minutes time may net you as high as $65.

Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.

We'll do the finished writing and drawing for you.

Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors

JULY PRACTICAL IDEA WINNER was "Vac Trick Ends Foam Trouble," submitted by Ed Teeny, Food Technology Department, Oregon State College, Corvallis, Ore.

Made with the skill that assures protection

This 17th Century Gauntlet typifies the skillful craftsmanship of medieval armormakers. The expert positioning and attachment of adjacent parts permit all the necessary flexibility. The intricate carving and embossment give it a distinct, attractive appearance. And the careful design and workmanship assure the maximum protection. In battle and in jousts, combatants had to depend on the armorer's skill . . . often for their lives.

Jones & Laughlin Steel Containers provide dependable protection for your products. They are built of sturdy, high-quality J&L Steel Sheet. Careful manufacture assures accuracy in all fittings and closures. J&L containers have a trim appearance which can be decorated attractively with colorful designs and illustrations by means of J&L's lithographic process.

Coatings and lacquers are evenly applied—both inside and outside. J&L pails and drums are chemically treated to keep all surfaces clean and dry.

Depend on J&L Steel Containers for the protection your products require.

Order them through plants in leading industrial centers. You will find J&L service prompt and efficient.

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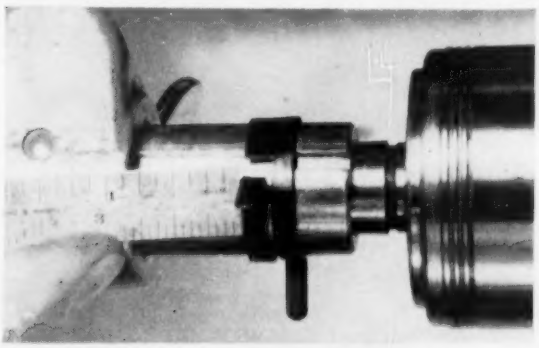
the top connection by the use of a positive pump with a by-pass in order to control the amount of marshmallow pumped into the ice cream.

Device is made of sanitary piping and block-tin tubing entirely, although stainless steel tubing in place of the block tin would be preferred.

Here is the way we make up. We whip the purchased marshmallow syrup ourselves under refrigeration to the same temperature as the ice cream, or in other words 22 deg. temperature into an 80% increase in volume. This provides a Rocky Road ice cream that has a good chewy body, and also with an attractive distribution throughout the ice cream.—*Hal H. Dunklee, Plant Superintendent, Chism Ice Cream Co., Reno, Nevada.*



Way to Control Drilling Depth

Though some lathes have tailstock barrels graduated in inches so a drill may be fed into the revolving work to an accurate, pre-determined depth, many other lathes are without any means of measuring the travel of the tailstock barrel. In the latter case various improvised methods must be evolved.

One good device for controlling the depth of drill penetration comprises a metal clip made from springy strip. Half the width of strip (see photo) is removed from either end so that it can encircle the tailstock barrel without overlapping. Narrow portions of strip are bent up to form lugs which serve the dual purposes of finger grips for moving clip along the barrel and also as a datum for making contact with the end of a steel rule which is held in place by hand.

In use, the drill point makes contact with the work, and clip is slid along barrel until it makes contact with front face of the tailstock body. As the drill is fed progressively into the work, the gap between lug and tailstock body increases and indicates depth to which the drill has penetrated. This gap can be measured easily by laying a rule across it.—*C. T. Bower, Tool Engineer, London.*

Chocolate Chip Ice Cream Method

We have found that by drawing approximately 3 gal. of ice cream from a bypass outlet into a 5-gal. can, and then by pouring ½ gal. of melted chocolate into this and mixing quickly with a common stirring rod, we obtain a very fine break-up of chocolate chips.

After this is done the batch is incorporated directly through the fruit feeder. In this way the quantity of chips in the finished product can be controlled by the usual adjustments that are standard on all fruit feeders.

This operation can be accomplished without any alteration of the equipment and the danger of the chocolate solidifying in the valve is completely eliminated. It is a time and labor saving procedure that also reduces the chances of ingredient loss. Maintenance and clean up are also minimized.

With a little practice it is possible to allow the bypassed valve to drip slowly so that approximately 3 gal. of mix can be kept ahead to make the operation continuous.—*Leland Zimmer, Plant Manager, Frezert Inc., St. Louis, Mo.*

–									+						
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Practical Weight Control Program

In the handling of any product, even if it is hand weighed, certain tolerances plus or minus must be established. The aim of the packaging department or the aim of the weight control program must be to stay within these tolerances. Naturally, tolerances will vary depending upon what is packed. If gold is the product to be packaged, tolerances must be quite strict. If, on the other hand, it is a raw material valued at 12 to 15¢ per pound, tolerances can be spread slightly without incurring excessive cost from product loss.

We have in our plant a noodle weigher with tolerances of ⅛ oz. plus or minus. We also have a volumetric filling system that we use to weigh out the seasoning ingredients that go into our soup mixes, but our tolerances here are slightly more than 1¼ grams.

The first thing we did, that should be done in any control program was to delegate responsibility to one individual. We felt that the actual control program should be not in the production department. Human beings have peculiar characteristics. They do not like to find themselves wrong. Therefore, we felt that if we took the weight control out of production entirely we would be better off. And it has worked out very much as we expected.

We have a regular spot check taken daily, and in our particular case we have a part time employee who comes in specifically for weight control and quality control work. We have set up no form except a simple little card (see sketch). These cards go directly to management and then they are routed to the production department if need be. The information on the cards is graphed, and reports are submitted monthly to show trends in certain machines and departments.

We had one weight problem which we felt was most important from the standpoint of government regulations and customer satisfaction. We, therefore, set our tolerances slightly above under-weight. The overweight problem is a problem of cost. That's our problem. We have to see that those overweights are kept down to a minimum. in dollars and cents the whole program hasn't cost too much. It involves only a little time spent by this part time employee. It has put everyone on the alert to recognize the problem of over- and under-weight.—*Alvin Karlin, I. J. Grass Noodle Co., Chicago.*

COLLECT IT

AS IT ACCUMULATES — SOLIDS, POWDERS, SLUDGE, LIQUIDS
RAW MATERIALS, FINISHED PRODUCTS, WASTE MATERIALS

Heavy waste is dumped into an open container at a foundry in New York. The first step in the LOAD LUGGER SYSTEM of materials handling is to place a number of containers at strategic points to collect material as it accumulates, reducing handling at the point of origin.

Light material accumulates in an open container with high sides at a shipping carton plant in Louisiana. Rugged LOAD LUGGER containers are built of welded steel, have deep leak-proof bottoms, hold from 1½ to 14 cubic yards and more, and handle all types of material.

It is easy to load this 14-cubic-yard LOAD LUGGER container of a St. Louis contract hauler. It fills to the top without raking and is wind-proof and rat-proof. A model with rubber seals and latches is also theft-proof, fly-proof, dust-proof, and almost odor-proof.

PICK IT UP

ALREADY LOADED — NO LOST TIME AND NO LOADING CREWS
LET ONE TRUCK AND DRIVER DO IT ALL — REPLACING MANY

A full container is picked up at a refinery in Indiana. The second step in the LOAD LUGGER SYSTEM is for one driver and his truck equipped with a hoist-body to pick up full containers on a regular schedule. This procedure does away with lost time and loading crews and eliminates the need for several conventional trucks and their drivers.

A bearing manufacturer in Ohio picks up a full container of dolomite. LOAD LUGGER hoist-bodies (flat-bed truck bodies with a pair of hydraulic-powered hoisting arms) handle pay loads of up to 18,000 pounds and more. They are easily mounted on any truck chassis of suitable capacity, and all controls are installed in the cab.

An open container used for accumulating industrial wastes is picked up by a Chicago contract hauler. For greater safety, LOAD LUGGER hoist-bodies lift containers with four-point suspension and have double-acting hydraulic cylinders for positive control at all times.

LOAD LUGGER®

ENGINEERING B-W PRODUCTION

• FLAT-BED TRUCK BODIES WITH HYDRAULIC HOISTING ARMS
• LEAK-PROOF TILT-DUMP CONTAINERS FOR BULK MATERIALS

HAUL IT

IN MANY TYPES OF CONTAINERS — OR ON THE TRUCK BED IN PLANT AND OVER THE ROAD — ON YOUR TRUCK CHASSIS

A city truck in Ohio hauls a full container of repair materials. Government approval is evidenced by the many such municipal, state, and federal installations. Hauling full containers is the third step in the LOAD LUGGER SYSTEM, and over-the-road hauls are as feasible as in-plant because of the use of standard truck chassis.

A full container of residue materials is hauled at a corn products processing plant in Illinois. LOAD LUGGER hoist-bodies carry containers well forward for correct load distribution and cradle them between steel sidewalls for greater travel safety.

LOAD LUGGER hoist-bodies also carry materials or equipment directly on their flat beds, loading and unloading heavy objects with their hoisting arms.

This special hoist-body of a Michigan telephone company transports heavy cable reels. Such new uses for LOAD LUGGER equipment are constantly being developed.

ENGINEERED, MANUFACTURED, AND MARKETED BY BROOKS EQUIPMENT & MFG. CO., SUBSIDIARY OF

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CORPORATION — DISTRIBUTED INTERNATIONALLY

DUMP IT

BY TILTING CONTAINER VERTICALLY OVER REAR APRON, OR DELIVER IT BY EXCHANGING FULL CONTAINER FOR AN EMPTY

Spent solvents are dumped into incinerator tank at a drugs and medicines manufacturing plant in Michigan. Delivering full containers or dumping their loads is the fourth step in the LOAD LUGGER SYSTEM. Returning empty containers then completes the cycle.

Metal scrap is dumped and spread in the yards of a scrap metals service company in Iowa. LOAD LUGGER hoist-bodies handle more pay load on a given truck chassis, because they are lighter than comparable equipment. And their patented simplicity, clean design, and sturdy construction make them cost less to buy and maintain.

Equipment of a Miami contract hauler in the dumping position. The LOAD LUGGER hoist-body has outrigger jacks to protect rear springs and axles from injury while picking up and putting down heavily loaded containers, but it neither needs nor uses these jacks while tilting container over rear apron to dump or spread the load.

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FLAVOR-GRAM

CAPSULED RESEARCH FACTS

THAT SHOW HOW AC'CENT CAN CREATE CONSUMER PREFERENCE FOR YOUR PRODUCTS

Everyone realizes the value of flavor in building acceptance and sales for food products. Modern canning and quick-freezing have taken great steps toward capturing this elusive but important characteristic.

AC'CENT, *pure* monosodium glutamate, adds further improvement. It is the only ingredient that *builds* and *holds* natural food flavors, without *adding* flavor.

The fresher the food, the greater the glutamate content. This diminishes rapidly prior to and during processing. AC'CENT *builds* flavor by restoring the natural glutamate content to its original level.

And because AC'CENT is stable, it *holds* these natural flavors through freezing, canning, storing. In fact, AC'CENT literally "keeps foods young."

THE VOTE GOES TO "AC'CENT." When more than 3,000 families were asked in a survey to name the brand that first comes to mind for a flavor enhancer, 27% replied, "Ac'cent."

The next-highest brand mentioned, 5.1%; miscellaneous replies, 15.3%; "don't know," 44%; no answer, 8.51%; "monosodium glutamate," .09%.

All of which proves that Ac'cent is on the tips of more tongues than any other brand of flavor enhancer.

LONGER LIFE FOR FROZEN FOODS. Addition of Ac'cent to frozen foods lengthens storage life and improves flavor acceptability.

In a 12-month test* on frozen seafood, meat, poultry, and vegetables it was found that Ac'cent effectively retarded flavor and color loss in food during storage. It also had an anti-oxidant effect on meat and fish.

Among effects testers noted: color of green vegetables and seafood was improved. Treated samples were more tender after cooking.

Vegetables had a full, rounded-out, sweet taste. Poultry had improved flavor...was juicier and of better texture. Frozen foods tasted better than ever when Ac'cent was added. Ac'cent keeps "frozen foods young."

*"*The Use of Monosodium Glutamate in Frozen Foods" by Norton, Tressler & Farkas, FOOD TECHNOLOGY, Nov. 1952.

CONSUMER PREFERENCE IN CANNED VEGETABLES. 12 out of 13 canned vegetables were definitely improved by the addition of monosodium glutamate, said consumers in a recent taste test by the Quartermaster Food & Container Institute, Chicago. Among the 12 preferred items were: asparagus, corn, green beans, peas, spinach, lima beans.

These findings are important considerations in building consumer acceptance of food products. Let Ac'cent, pure monosodium glutamate, give your product a flavor-edge in the competitive market.

Literature and detailed information about any of the items mentioned above are available on request. Just drop us a line on your letterhead.

Ac'cent®
PURE MONOSODIUM GLUTAMATE

FLAVOR MAKES SALES . . .
AC'CENT BUILDS NATURAL FOOD FLAVOR

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B. F. Goodrich announces

Koroseal belt washes like glass, cuts cleaning time in half

STICKY icings, jelly, most stains wipe right off that belt with just a damp cloth. That's because it's made of Koroseal, the flexible material developed by B. F. Goodrich.

The Koroseal belt has a smooth, polished surface that even oil can't penetrate. Food particles can't grind in. So there's no need to scour it. A few seconds with a damp cloth and the Koroseal belt is clean and looks as new as the day it was put on. No wonder users say it cuts cleaning time in half. And since Koroseal is completely, permanently waterproof, the belt cover never gets damp or soggy, and so can be used right after washing.

Koroseal resists cracking and peeling, doesn't get sticky. And there's no danger of contamination with Koroseal because it is nontoxic, and has no odor or taste to transfer to foods. With its high resistance to cooking oil, animal fats, and most acids, the Koroseal belt is ideal for bakeries as well as places where meats, nuts, greasy pans are handled.

Two other belts, developed by B. F. Goodrich for food handling, are called Highseal and Kleenseal and are made of new types of rubber compounds. Their "sight-saving" green color reduces glare and eyestrain on packaging and inspection lines.

It will pay you to find out more about these work-saving, money-saving improvements in food handling. First step is to have your BFG distributor survey your belting needs and recommend the right B. F. Goodrich belt for your process. If you don't know the distributor nearest you, write us and we'll send his name. *The B. F. Goodrich Company, Dept.* M-470, *Akron 18, Ohio.*

Koroseal—T.M. Reg. U. S. Pat. Off.

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

For more information, use coupon on last page.

MODERNIZING?

New equipment needs the right instrumentation

When you're planning to install new equipment, plan to take advantage of the full potential of modern methods of measurement and control. It's the sure way to get top value for your modernization investment . . . for the improvements in production economy, quality, and versatility possible with today's production equipment depend increasingly on control instrumentation.

Here are two important points that deserve consideration if you're planning to modernize:

1. Design for control. Instrumentation is more than a necessary appendage. It's a vital, integrated part of the process itself. *Control design goes hand in hand with process design.*

2. Get the right instrument for the job. This seems obvious—but all too often instruments may be stretched or squeezed to fit applications for which they were never intended. *Each instrument should fit its function.*

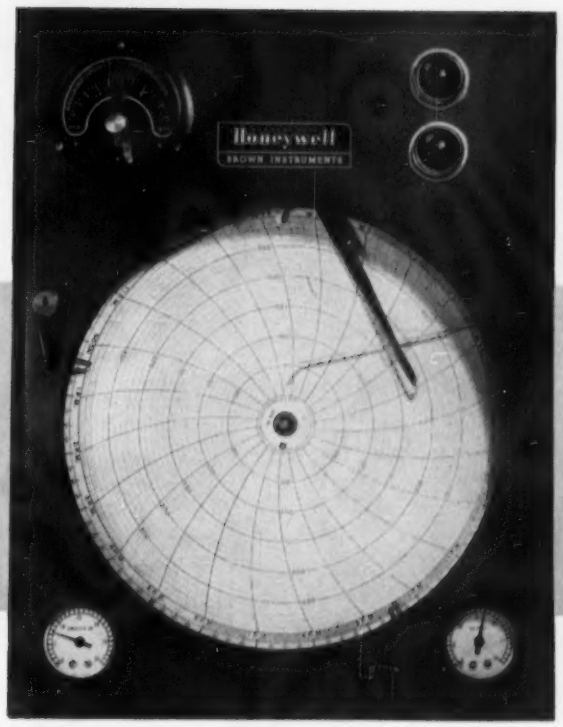
On point number 1, Honeywell's experienced application engineers will be glad to cooperate with your own staff to recommend ways in which you can obtain the full benefit of modern instrumentation. They have an extensive background not only in contact technology, but also in the processing problems of various industries.

On point number 2, Honeywell offers an exceptionally wide line from which to choose. You're sure to find instrumentation with exactly the right performance . . . at the right cost . . . to fit your process. You eliminate problems of "shopping around"... and divided responsibility. This one source can fill practically all your measurement and control requirements.

A talk with your nearby Honeywell sales engineer will give you a detailed picture of what instrumentation can mean in your modernization program. Call him today . . . he's as near as your phone.

Canning and cooking cycles controlled automatically by

For information on the varied line of ***ElectroniK*** *instruments applicable to food processing operations, write for your copy of Catalog 1531,* ***"ElectroniK Controllers."***



Complete cooking control system *consists of new small case pressure controller (left) and Brown thermometer controller (right) with integral timer and signal lights.*

new Brown Control System

ONCE you have determined the best temperature cycle for cooking canned meats to top quality and uniformity . . . how do you duplicate these conditions consistently in production?

For a simple, effective answer to this problem, investigate the two Brown controllers shown here. Readily applied to your own cooking and canning equipment, they take the guesswork out of process control . . . make the whole operation completely automatic and free from human error.

Time-temperature cycles are regulated by a Brown thermometer controller with built-in timer and signal lights. You just set the control index to the temperature you want, and turn the timer dial to the number of minutes desired at temperature. The cycle starts automatically. Under control of the instrument, cooking temperature is raised to the set value, held for the prescribed time, and then the heat supply is turned off. Signal lights tell the operator when temperature is reached and when the cycle is finished. Cycle time can be anywhere from a few minutes to three hours. The instrument's chart gives you a permanent record of the operation.

For pressure control, a simple, economical instrument has just been developed for the specific needs of canners. It regulates retort pressure to prevent excessive differential pressures between the inside and outside of the can or glass jar. Especially valuable during blow-down, this instrument gives dependable protection at low cost.

These two new instruments typify the control systems which Honeywell has developed for the diversified needs of the food industry. For a personal discussion of your own plant's requirements, call your local Honeywell sales engineer . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

● **REFERENCE DATA:** Write for Bulletin 6440, "Thermometer with Timer and Signal Lights"... and Bulletin 7040, "New Small Case Pressure Controller."

H HONEYWELL

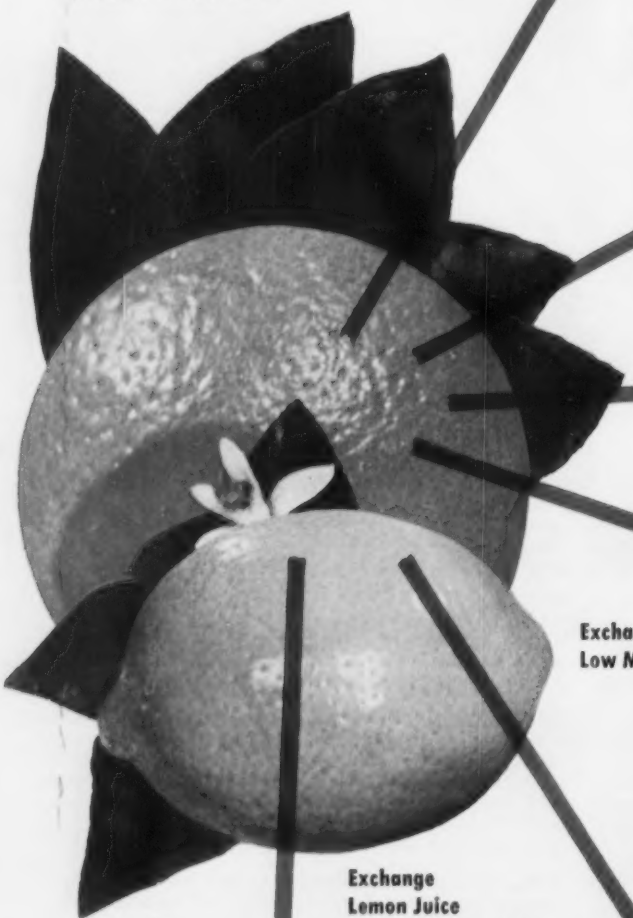
MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

First in Controls

Look to Sunkist
for progressive research in food processing

Yes, in every field of food processing, the Sunkist Growers laboratories are making ever-widening contributions to the increased quality of food products. Here are some typical Exchange Brand product developments.



Exchange Oil of Orange

Always consistent, always outstanding in flavor, strength and aroma. An essence you can rely on. Made from fruit grown in the famous Sunkist groves of California.

Exchange Oil of Lemon

The 4-to-1 favorite over all other lemon oils combined! The reason is the superior flavor that comes only from California-grown lemons processed by exacting Sunkist standards.

Exchange Preserver's Pectin

Here is *even* jell strength that gives you consistent, complete reliability in setting control.

Exchange Low Methoxyl Pectin

A natural fruit pectin that jells without sugar. Completely tasteless, permitting the use of the most delicate flavors. Pies made with Exchange Low Methoxyl Pectin won't "run" or "weep" when cut—and you have never tasted such natural juicy fruit flavor. Famous too for aspics, jellied fruit or vegetable salads, dietetic preserves or non-sugar jells.

Exchange Lemon Juice

Nothing can match lemon juice for bringing out the natural flavor of *any* food product. It's a superior acidulant in the preparation of mayonnaise, fruit cocktail, figs, fruit nectar, prunes and other heavy-syrup products. Highly effective as an anti-oxidant in processing frozen foods. Citric acid molecules have also been established as effective in the retarding of mold growth. Available in concentrated or single strength form.

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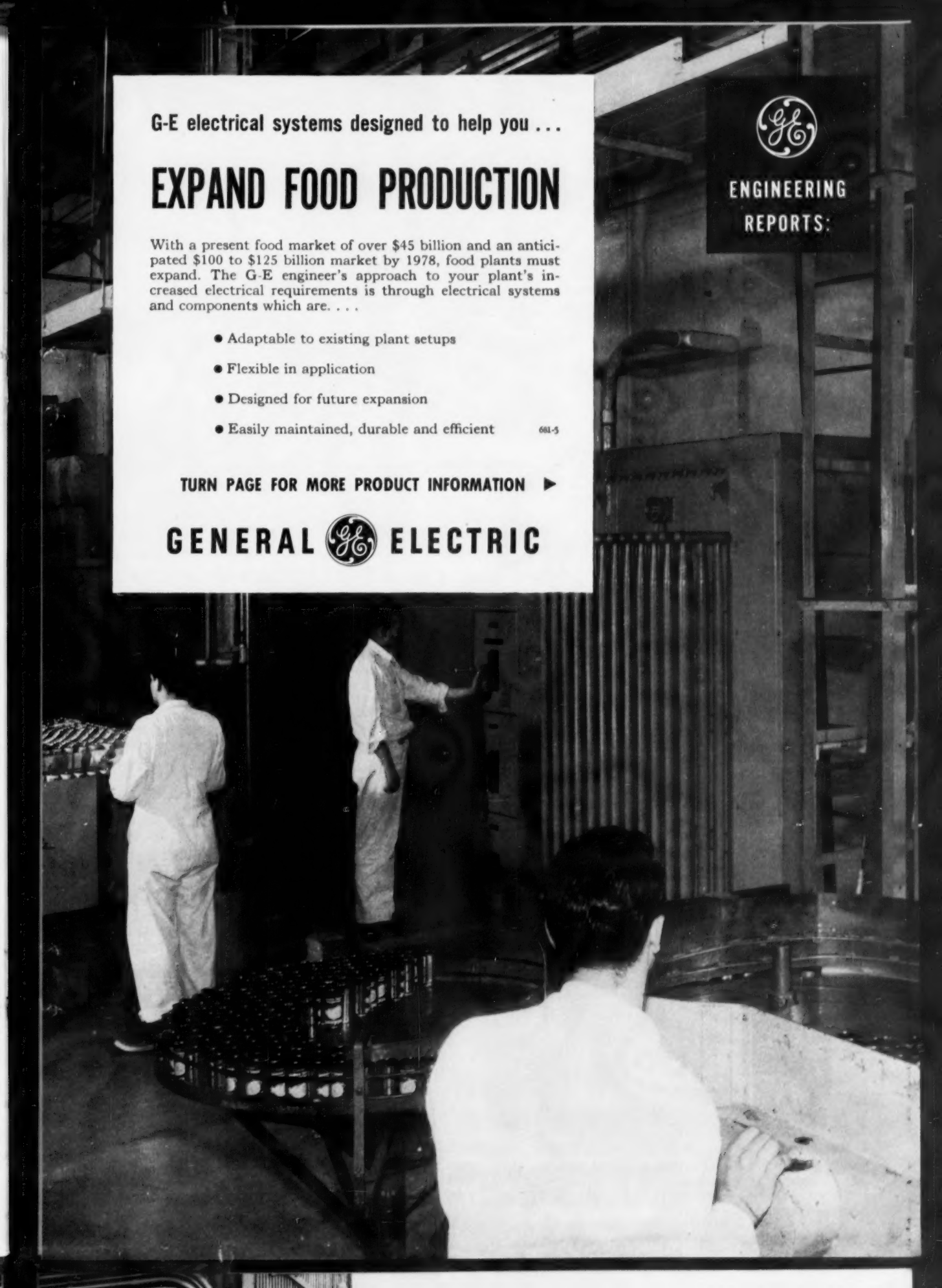
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EXPAND FOOD PRODUCTION
With a present food market of over $45 billion and an anticipated $100 to $125 billion market by 1978, food plants must expand. The G-E engineer's approach to your plant's increased electrical requirements is through electrical systems and components which are. . . .
• Adaptable to existing plant setups
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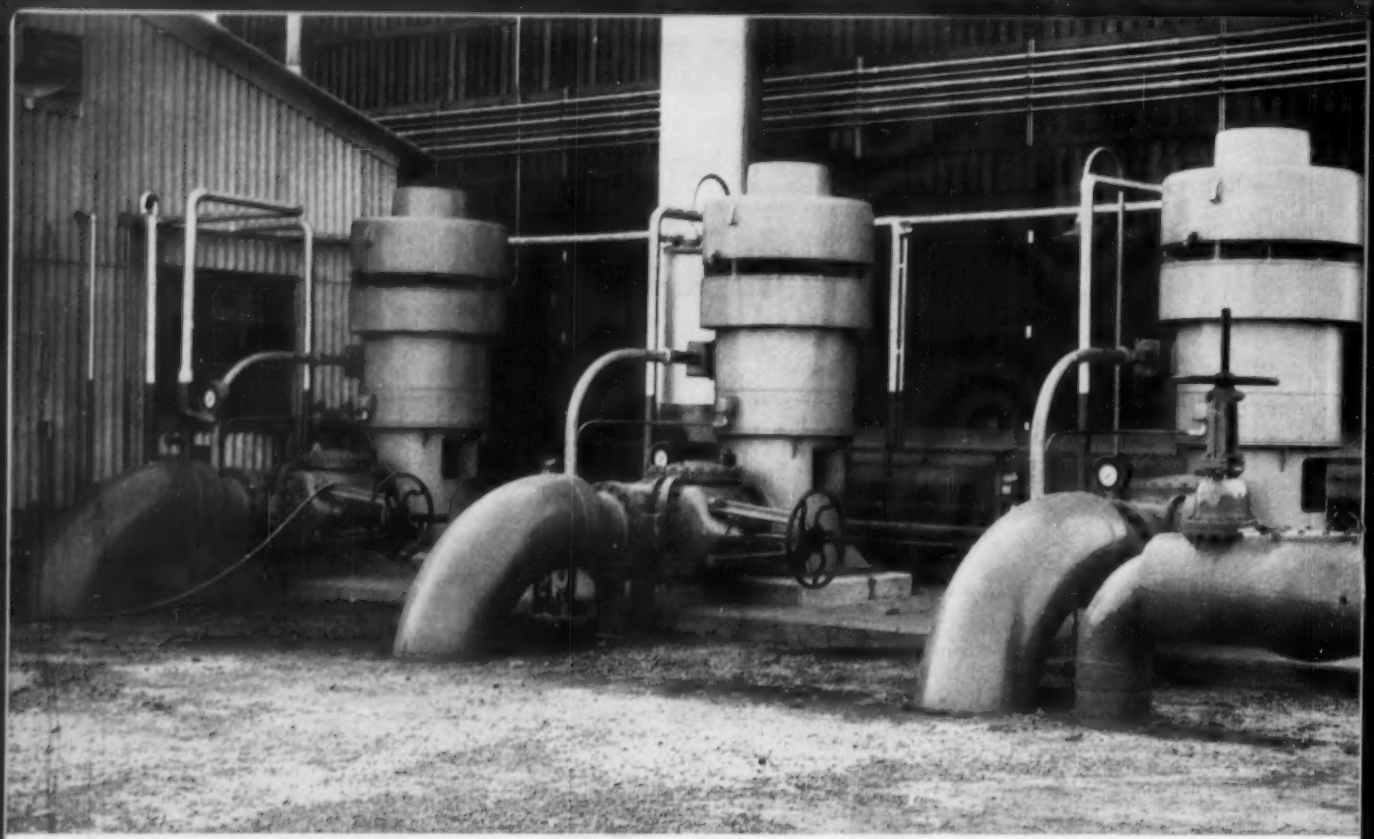

SEVERAL AVAILABLE TYPES of protective enclosures make G-E motors ideal for all indoor or outdoor uses. New Polyex insulation

G-E ENGINEERED DRIVES AND POWER SYSTEMS MEAN . . .

Modern, more flexible processing lines

IN THE NEXT TEN YEARS, production must increase an estimated 50% to meet greater consumer needs. Available manpower will increase only an estimated 14% during the same period.

INCREASED OUTPUT AND EFFICIENCY must close the production gap between available manpower and estimated demand. General Electric electrical systems are designed and installed for efficient, flexible, easily expanded production.

G-E ENGINEERING SERVICES (see back page) can help you meet production requirements to bring your electrical system up to date. The result is a modern system integrated into your present plant setup.

FOR ADDITIONAL INFORMATION on how G-E engineered systems and engineering services can help you, contact your G-E Apparatus Sales Representative during your early planning at the nearest G-E Apparatus Sales Office. General Electric Company, Schenectady 5, N. Y.

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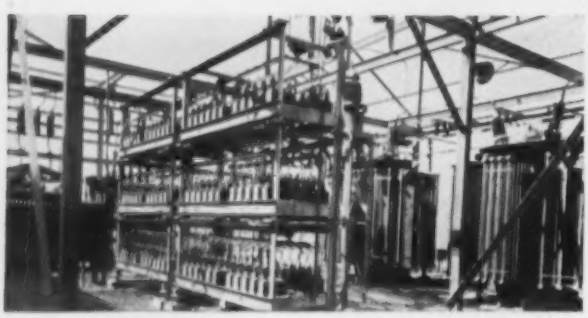
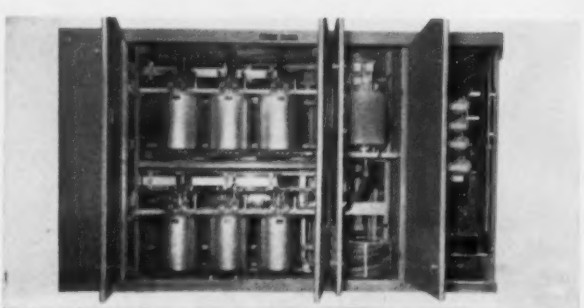
Engineered Electrical Systems for Process Industries

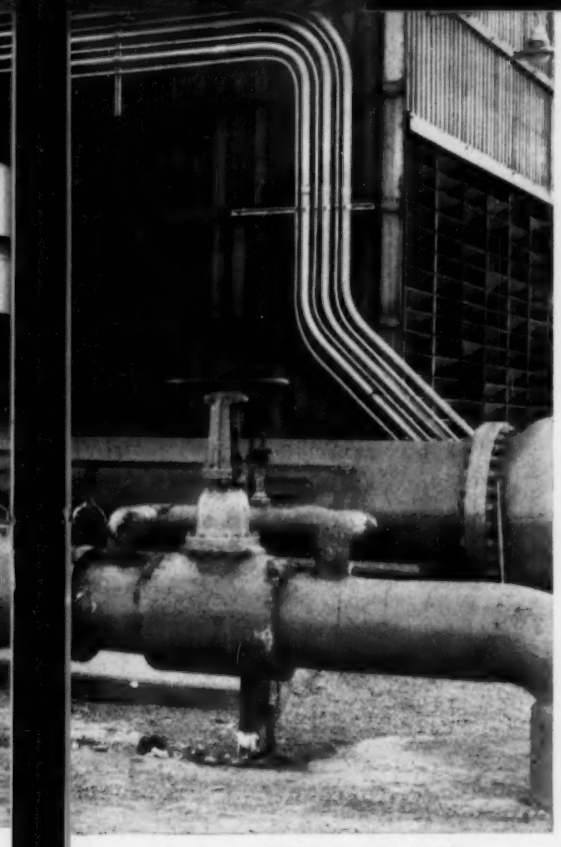
GENERAL ELECTRIC



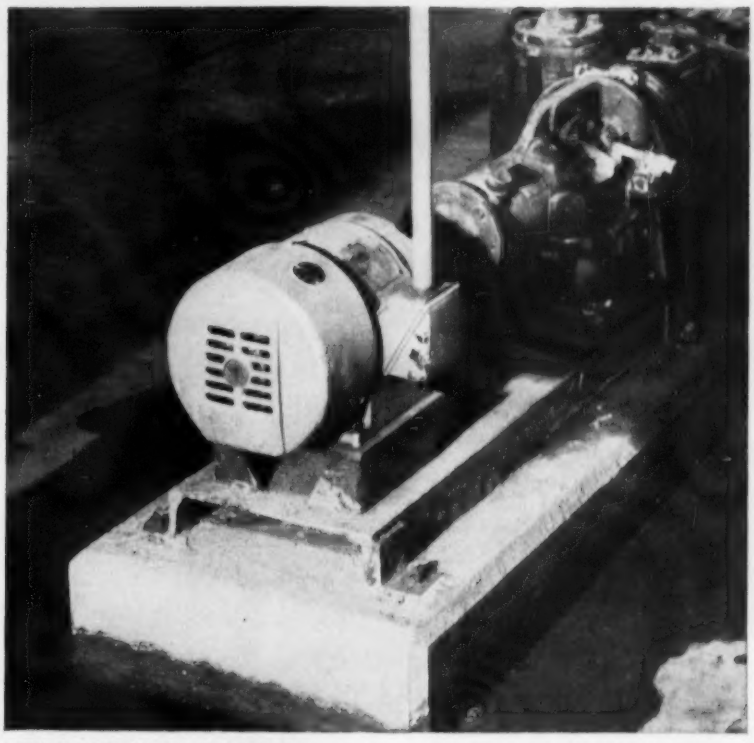
"BUILDING-BLOCK" design of this stack-rack capacitor block reduces installation costs. This design means equipment may easily be expanded or moved to meet plant requirements.



HIGH EFFICIENCY and low installation cost of this pumpless rectifier provide more reliable and economical d-c power. Factory wired, the unit is ready when it arrives to connect and operate.



gives up to 50% longer motor life.



NEW G-E TRI-CLAD* '55' MOTORS, totally enclosed, are suitable for damp areas, even where hosing is necessary. New cooling system cleans while it cools motor.

for your plant

G-E MAGNETIC STARTERS and safety switches are compact, for maximum space savings. Short-circuit protection is provided by circuit breaker or fusible disconnect switch.

CORROSIVE ATMOSPHERE effects are greatly minimized in these G-E Tri-Clad induction motors. Rugged cast-iron construction makes them excellent for process application.

SHORT CIRCUIT PROTECTION up to 60,000 amps, plus 50% greater space savings are provided by all-new G-E Limitamp*.

*Reg. Trademark of General Electric Company

SIX G-E ENGINEERING SERVICES . . .

HELP YOU PROTECT YOUR EQUIPMENT INVESTMENT

1 **G-E APPLICATION ENGINEERING** helps you and your consultants design the right electric system for your plant.

2 **G-E ANALYTICAL ENGINEERING** helps attain the optimum electrical system for your application. Engineering experience backed up by electronic system analyzers save valuable design time.

3 **G-E PRODUCT DEVELOPMENT** laboratories design and test new equipment under tomorrow's conditions to meet your future demands.

4 **G-E FIELD-SERVICE ENGINEERING** helps you supervise installation, expedite start-up of your major electric equipment.

5 **G-E MAINTENANCE SERVICE** from 36 G-E Service Shops will repair and uprate your old equipment, help establish productive maintenance of your equipment, furnish emergency service.

6 **G-E PROJECT CO-ORDINATION** means on-time engineering, shipment, installation of your electric equipment from preliminary diagrams through start-up.

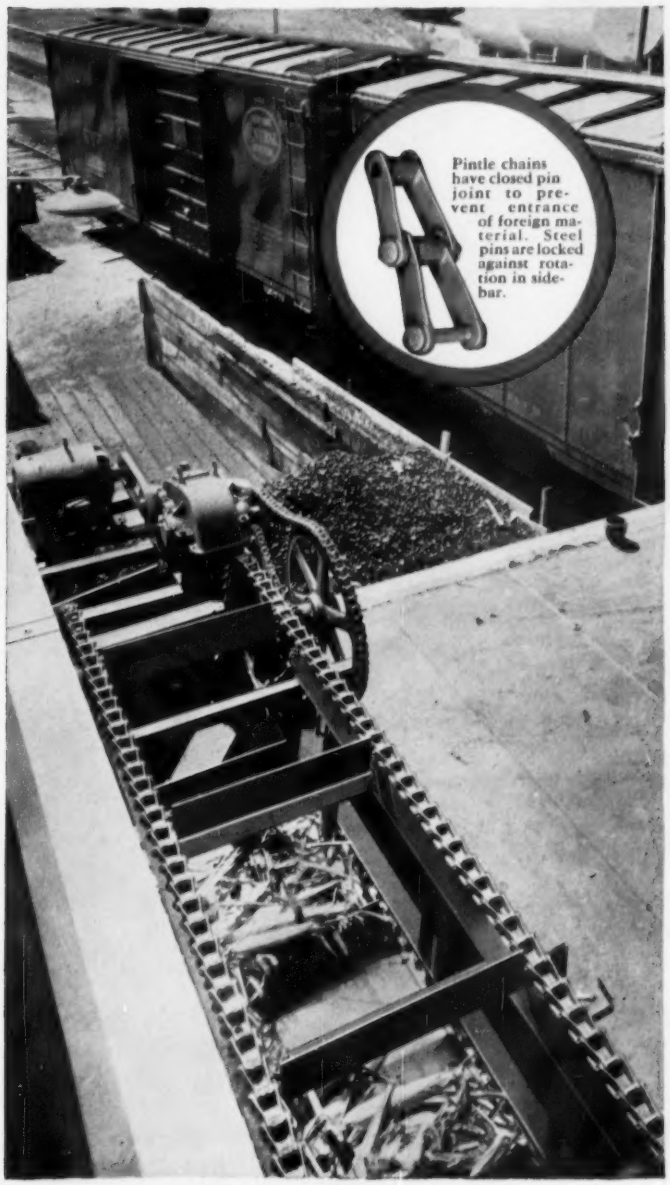
These valuable services are available to you with General Electric equipment. Contact any General Electric Apparatus Sales Office. Meanwhile, for the full story of G-E engineering services, write for brochure GED-2244, General Electric Co., Section 681-5, Schenectady 5, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Stubborn resistance to wear makes this chain a

favorite of the food industry


Pintle chains have closed pin joint to prevent entrance of foreign material. Steel pins are locked against rotation in sidebar.

LINK-BELT pintle chain also offers low cost and versatile conveying

HERE'S another popular Link-Belt chain in the food field. It's pintle chain which can be effectively adapted to many conveyors, elevators, and drives. Low-cost pintle chains are available in malleable iron or super-tough Promal with a great variety of attachments to meet your exact requirements. And consistent with Link-Belt standards, accuracy and uniformity are assured by strict control throughout manufacture.

Depend on the completeness of Link-Belt's line for the best answer to all your chain needs. From no other source can you get so broad a range of silent and roller chain . . . of cast, combination, forged and fabricated chains with mated sprockets.

Get Link-Belt chains for all your needs from your nearest Link-Belt Factory Branch Store or Authorized Stock-Carrying Distributor.

Continuous supply of corn to canning plant is achieved with the help of this flight conveyor consisting of two strands of Link-Belt No. 488 Promal pintle chain with A-42 attachments and slats spaced every 12th pitch. Conveyor is driven through Link-Belt parallel shaft gear and roller chain drives.

PLUS A COMPLETE LINE OF MATCHING SPROCKETS

LINK-BELT

CHAINS AND SPROCKETS

13,902

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

For more information, use coupon on last page.

YOU CAN DEPEND ON THE Richardson E-50!

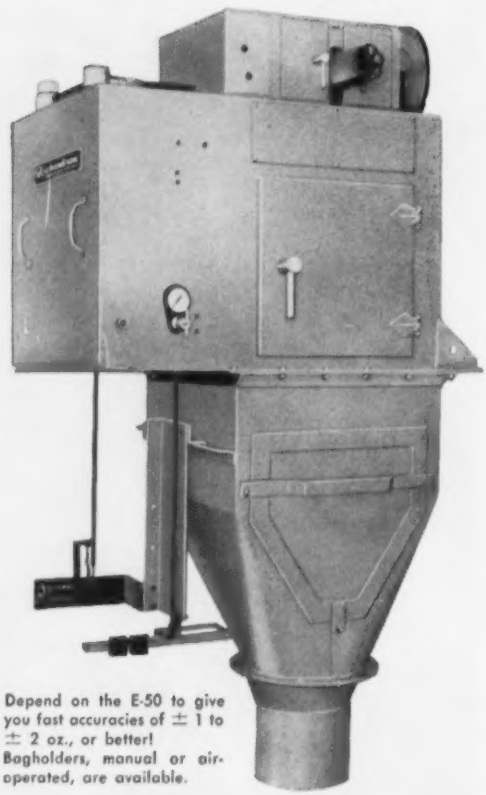
When the weighing is fast and the materials are loose (or even sluggish!), and you're having a running battle with profit loss from weight inaccuracy or the high cost of bagging and scale upkeep . . .

here's one scale that won't let you—or your profits—down!

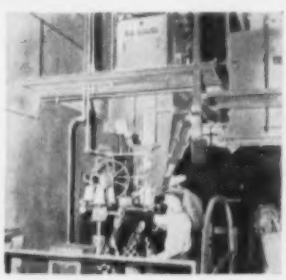
IT'S DEPENDABLE! The E-50's work-horse dependability makes it the perfect choice for any plant *where output vitally depends on the perfection of the bagging scale.* And upkeep is low! You'll find Richardson Scales still in operation after 30 and more years of service.

IT'S FAST, ACCURATE! With the rugged, completely automatic Richardson E-50 you'll get high speed bagging with accuracies *that never before were a practical possibility*—up to 1/10 of 1% under optimum conditions.

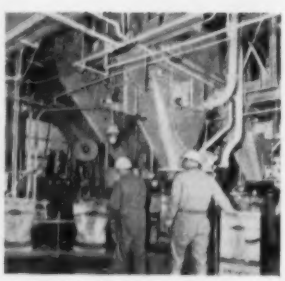
IT'S VERSATILE! Unique design permits the weighing of hundreds of food, chemical, grain and other materials. The E-50 is equally efficient as an independent bagging machine, or as an integral part of a co-ordinated production line packaging system. Don't let weight inaccuracy and bagging costs pick your pockets. Find out about the scale that really unties production tie-ups—Richardson E-50. Write today for free illustrated bulletin #3749A that tells the whole cost-saving E-50 story!



Depend on the E-50 to give you fast accuracies of ± 1 to ± 2 oz., or better! Bagholders, manual or air-operated, are available.



Duplex Model E-50 bags poultry mash up to twenty-two 50-lb. bags per min. at leading feed mill.



Ten 50-lb. bags per min. of antibiotic are delivered from Duplex E-50 in major pharmaceutical plant.

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

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does practically every grease job in your plant!

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POCO HT Grease

is ideally suited for applications subject to extreme temperatures, moisture, speed and load. Here's why:

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Let your local Pure Oil representative tell you how improved POCO HT can cut lubrication costs for you. This may be the only grease you need in your entire plant. Why not call now and find out?

Now it's easier than ever to

"SIMPLIFY AND SAVE"

With improved POCO HT headlining Pure's Multi-Purpose lubricants, you can now save more than ever with Pure's "Simplify and Save" Plan. Find out how it will work in your plant. Write for full literature. The Pure Oil Co. 35 E. Wacker Drive, Chicago 1, Illinois.

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Sales offices located in more than 500 cities in Pure's marketing area.

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Most Modern Design!

Get both in new Chevrolet Task-Force trucks. Modern styling that actually works for you! Modern power in the shortest stroke V8's* in any leading truck!

CHEVROLET

Styling that's designed to make money for you—It's a fact. The ultra-modern, Powermatic design of a new Chevrolet Task-Force truck calls attention to your business, favorably impresses customers and prospective customers! That's why on looks alone a Task-Force truck can make money for you. And it's *functional* styling. Panoramic windshield, new High-Level ventilation, concealed Safety Steps—these are styling features that double in brass to make the driver's job less of a chore. With safety and comfort increased, efficiency goes up. Tight schedules are easier to maintain and you keep the profits coming in on time.

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Most Modern Power!

V8 power—unmatched for efficiency! New Chevrolet Task-Force trucks bring you the industry's most advanced short-stroke V8 engines! Here are some of the features that make them the most modern V8's money can buy—

Modern 12-volt electrical system—You get double the voltage for quicker starting; more efficient ignition for finer performance. Plus a greater reserve of electrical power.

Gas-saving performance—With a high 7.5 to 1 compression ratio, Chevrolet's great new V8's squeeze extra power out of every tankful of gas. Your ton-mile hauling costs go down!

Extra-high power per pound—The efficient, compact design of these advanced Task-Force V8's results in less friction and wear, high output per pound of engine weight. That means more power is available for hauling!

With two power-packed V8's and five high-stepping 6's—it's the greatest engine choice in Chevrolet truck history! See your Chevrolet dealer soon for the most modern truck money can buy! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

**V8 standard in the new L.C.F. models, an extra-cost option in all others except Forward-Control models.*

Task-Force TRUCKS

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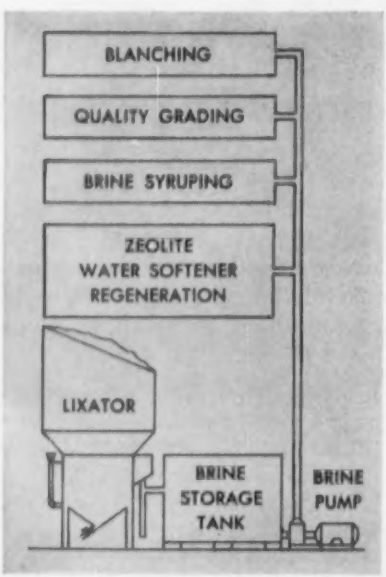
HOW THE LIXATE PROCESS SAVES MONEY, SAVES TIME IN THE FOOD PROCESSING INDUSTRY

100% SATURATED

BRINE

MADE AND DELIVERED AUTOMATICALLY, FOR ALL USES!



The simplified diagram at the left shows how with International Salt Company's Lixate Process all the brine needed in a canning plant is made *automatically* at one source. Then is automatically delivered, via piping, to as many points and for as many uses as desired. All plant rehandling of salt is eliminated. The brine is *always* constant in quality—*always* self-filtered—*always* 100% saturated —*always* crystal-clear.

One Lixate installation in a canning plant, for example, makes and delivers brine as needed—for blanching—for quality grading—for syruping—for regenerating zeolite water softeners.

Today, the Lixate Process continues to revolutionize brine making and brine handling throughout all types of industry. It makes better brine more efficiently, from economical rock salt. It saves many dollars daily by eliminating handling costs—and preventing costly production delays. Lixate brine is always on hand—always ready for instant use.

The Lixator always pays its own way—and pays many a large bonus as well. Write or 'phone for the full facts today. An International Sales Engineer will show you what the Lixate Process can do in *your* plant. Simply write to . . .

INTERNATIONAL SALT COMPANY, INC.

SCRANTON 2, PENNSYLVANIA

SALES OFFICES: Atlanta, Ga. • Chicago, Ill. • New Orleans, La. • Baltimore, Md. • Boston, Mass. • Detroit, Mich. • St. Louis, Mo. Newark, N. J. • Buffalo, N. Y. • New York, N. Y. • Cincinnati, O. • Cleveland, O. • Philadelphia, Pa. • Pittsburgh, Pa. • Richmond, Va.
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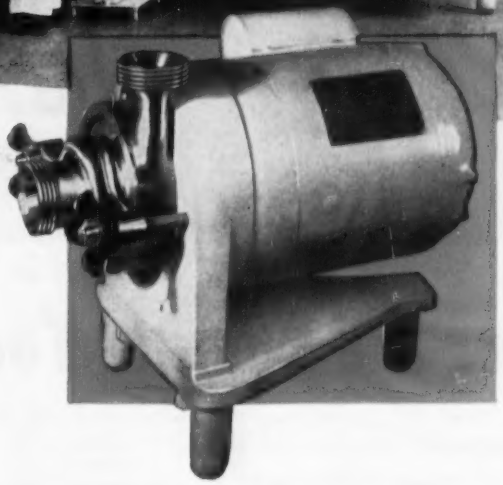
proved in service by leading dairy and food plants

Shown above, at one of the nation's leading dairy plants, are three Tri-Clover *"Nofome"* Sanitary Centrifugal Pumps selected as original equipment for these three Mojonnier Bros. Cold Wall Tanks—one of many typical efficient, sanitary installations using Tri-Clover *"Nofome"* Pumps now serving leading dairy and food plants.

If your own operations call for a sanitary pump particularly suited to meet exacting, *high head* requirements, take a look at the improved *"Nofome."* This well-known pump line, formerly a product of Specialty Brass Company, now includes Tri-Clover Division's latest design developments and is now more efficient than ever for scores of applications throughout the dairy and food industries.

A few "Nofome" design features tell the reason why these modern pumps are increasingly popular: *3 bladed impeller gives maximum efficiency without foaming or churning . . . heads are smooth, pocket-free and easily removed for thorough cleaning . . . rotary seals are located outside the product zone . . . roller bearings assure long life and quiet, trouble-free operation.*



TRI-CLOVER "NOFOME" PUMPS are available in two types: Pedestal Mount (shown in the top view) and "Pump King" (directly above) — in a wide range of capacities for handling 1,000 to 280,000 pounds per hour (water or liquids of similar viscosity). Heads up to 260-ft. available. Supplied with patented inert carbon seals or water-cooled rotary seals for a wide range of liquids and solids in solution.

For further details on the full line of Tri-Clover Centrifugal Pumps, write for Catalog No. 253.

See our display at the BAKING INDUSTRY EXPOSITION BOOTHS 825-827

See your nearest TRI-CLOVER DISTRIBUTOR
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Tri-Clover Division
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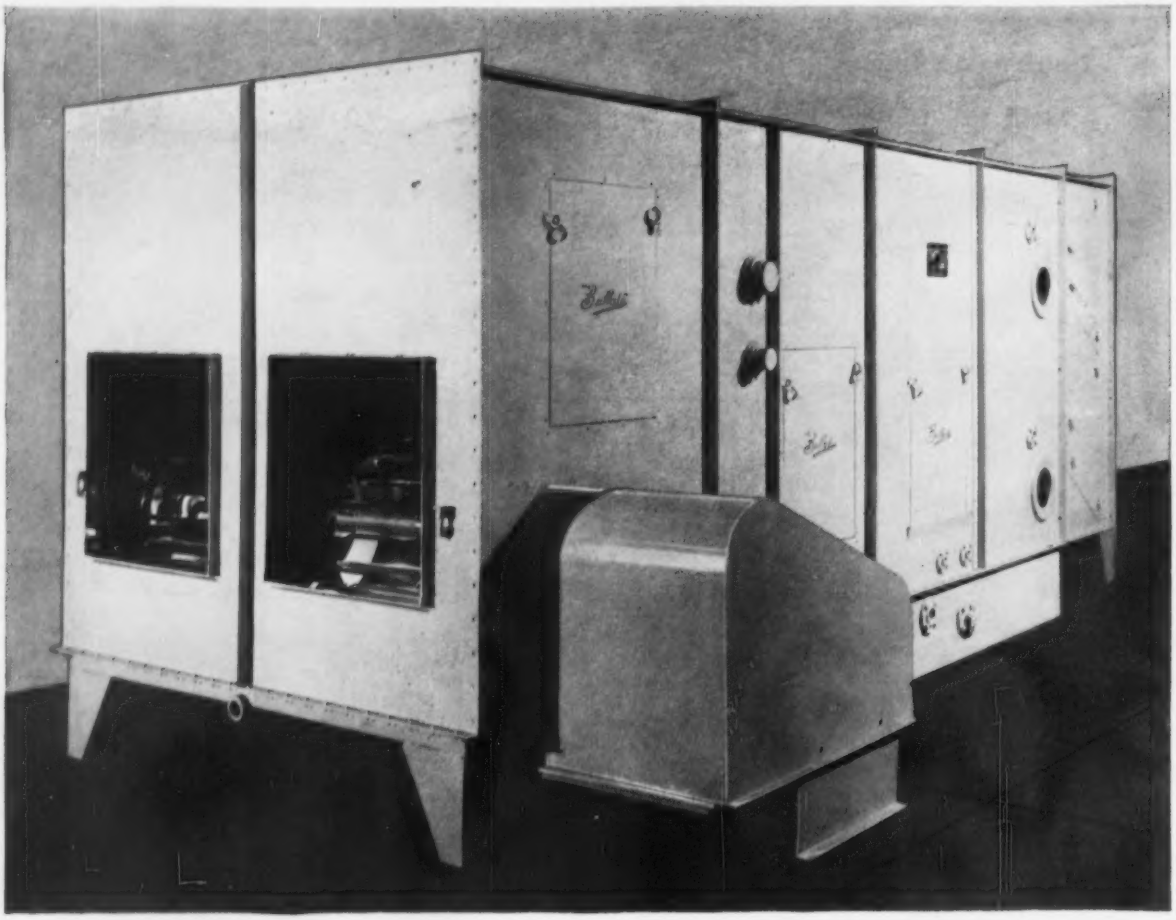

"Buffalo" Type PCGW Wet Cell Air Washer with fan, reheating coil, washer, tempering coil and filter section.

For the Climate Your Process Thrives in!

"Buffalo" Air Conditioning Equipment offers you the two factors necessary to maintaining the most favorable air conditions for your particular processes:

(1) **COMPLETE FLEXIBILITY** for any heating, cooling, humidifying, dehumidifying, washing and filtering requirements you may have. "Buffalo" Air Washers, Wet Cell Air Washers and Washed Coil Dehumidifiers are available in a complete range of models and sizes.

(2) **THE "Q" FACTOR** — the Built-in Quality that provides trouble-free satisfaction and long life, including the best engineering features to come out of our 78 years of experience in air handling. WRITE FOR BULLETINS 3142-E, 3457-B and AC 320. You'll find features like quiet, efficient "Buffalo" Pumps and Fans — famous "Buffalo" non-clogging spray nozzles — quality coils — heavy-duty sectionalized construction for easy installation and maintenance — all adding up to ADEQUATE, DEPENDABLE CONDITIONING WITH MAXIMUM ECONOMY. *Write for these Bulletins today!*

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PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

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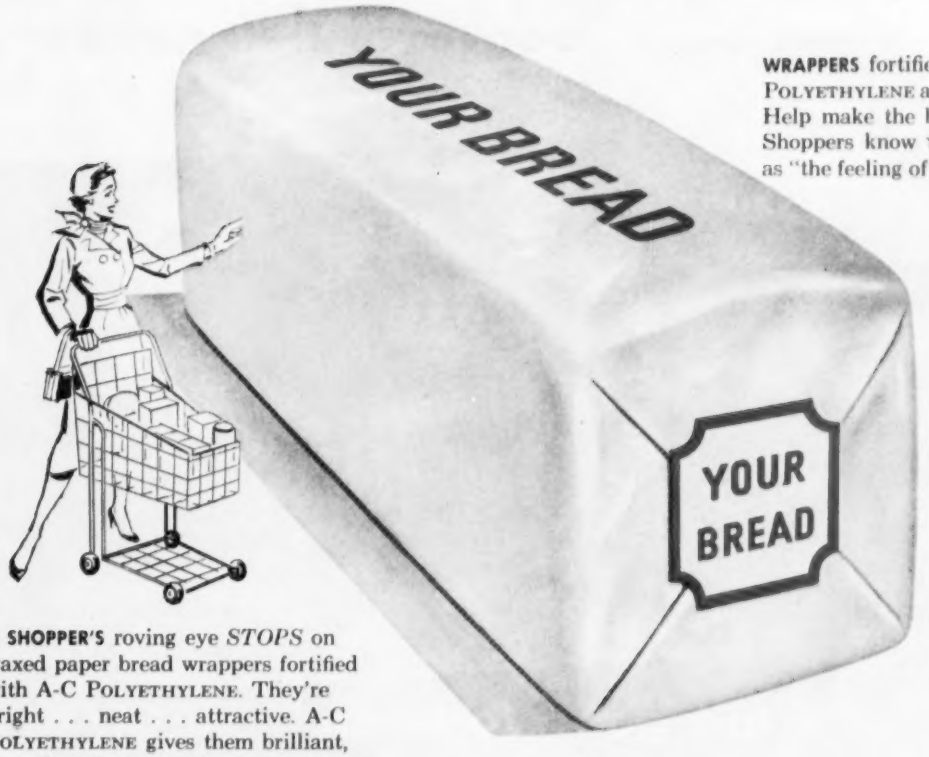
Every eye is on super-gloss bread wrap!



WRAPPERS fortified with A-C POLYETHYLENE are soft to the touch. Help make the bread *feel* fresh. Shoppers know that soft, smooth feel as "the feeling of freshness."

A SHOPPER'S roving eye *STOPS* on waxed paper bread wrappers fortified with A-C POLYETHYLENE. They're bright . . . neat . . . attractive. A-C POLYETHYLENE gives them brilliant, high gloss that lasts. Your name is seen better, faster, and more often!

TOUGH TOO! Your A-C POLYETHYLENE-fortified wrapper resists oily, greasy hands. Does away with scuffing, abrasion, wear and tear.

FOR "EYE APPEAL," "feel appeal," "sales appeal," use A-C POLYETHYLENE in your bread wrap. Ask your supplier for this better bread wrap.

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In this kit is the answer to all your conveyor belt needs!

THE LID'S OFF!

Now, for the first time, you can see in miniature a conveyor belt designed to your exact specifications... built right before your eyes... in only a few minutes of your time, on just a few inches of desk space. And this "U. S." Conveyor Belt Construction Kit can save your company countless hours, thousands of dollars of expense.

Completely new and exclusive with "U. S.", the Kit removes all uncertainty about the right belt for the specific job. Every type of materials handling problem, every kind of operating condition is taken into account. You see exactly how your conveyor belt must be constructed for highest output at lowest cost and long operating life.

Whether or not your present system has been giving you good service, you owe it to yourself to look into this unique and comprehensive analysis of your conveyor belt needs.

Absolutely free—no obligation whatsoever. It is strictly a service of United States Rubber Company. A "U. S." Sales Engineer will contact you in the near future. Or better still, why don't you call any one of the 27 "U. S." District Sales Offices and set up an appointment to see this remarkable new method of analyzing your conveyor belt requirements?

"U. S." Research perfects it..."U. S." Production builds it... U. S. Industry depends on it.

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248 calories if s

This month,

248 calories if sweetened with sugar

This month,

MILLIONS O

September sees Sucaryl a
pages in Life Magazine, p
—appearing in 91 major

Now, millions more di
just like sugar.

They'll be looking fo

If you are not counting calories, you don't need this new, non-fattening sweetener. If you are, you do.

You can save a lot of calories

OF DIET-SHOPPERS LEARN ABOUT SUCARYL!

ryl advertising go national . . . in full-color spreads and ine, plus This Week, Parade and independent supplements ajor Sunday newspapers.

re diet-shoppers will know about Sucaryl, and how it tastes

g for it on the label of low-calorie foods. And you can give them a Sucaryl-sweetened line without having to change your manufacturing processes.

We'll supply the Sucaryl free for a trial run. Just tell us whether you prefer Sucaryl Sodium or Sucaryl Calcium. Write to: Chemical Sales Division, Abbott Laboratories, North Chicago, Illinois.

248 calories if sweetened with sugar

148 calories if sweetened with non-caloric Sucaryl

Abbott Laboratories' new non-fattening sweetener —Sucaryl—opens up a whole new world of eating and drinking enjoyment to the millions who must watch their weight.

This is improved Sucaryl: A harmless substance without food value . . . without calories . . . but with the property of tasting just like sugar, and giving a sugar-like sweetness to drinks and foods. Sucaryl completely satisfies your craving for sweets when you're on a restricted, low-calorie diet. In normal daily use, improved Sucaryl sweetens without a trace of bitterness or aftertaste.

You can use Sucaryl everywhere: Use it in your morning coffee, on cereal or grapefruit. Use it in any and all cooking recipes that call for a sweetener. Foods prepared with Sucaryl can be baked, boiled or frozen without losing true, sugar-like sweetness. The only thing to remember is that the proper proportion to use varies with each recipe. So be sure to send for your free copy of the Sucaryl recipe book offered below.

You don't need Sucaryl if you don't have to worry about calories or carbohydrates. Sugar is one of the most highly concentrated sources of quickly available energy, and should be retained in normal diets. Sucaryl is intended for use in controlled diets. If you are in doubt about dieting, ask your doctor for proper guidance.

Look for the name Sucaryl on the label of prepared foods or beverages. It means that you can enjoy that low-calorie food or drink without adjusting your taste one whit.

If you are diagnosed as overweight or a diabetic, Sucaryl opens the way

If you are not counting calories, you don't need this new, non-fattening sweetener. If you are, you do.

You can save a lot of calories by sweetening with Sucaryl

...and you can't taste the difference

to greater eating pleasure. You can now enjoy a more normal variety of foods and beverages, and still follow the rigid requirements of your diet.

STRAWBERRY TARTS (*Makes 8 tarts*)

1 cup sifted, enriched flour	Cold water	2 tablespoons SUCARYL
½ teaspoon salt	1 quart strawberries	Solution or 48 tablets
⅓ cup shortening	(hulled)	3 tablespoons water

Mix and sift flour and salt; cut in shortening. Sprinkle with 1 tablespoon cold water; mix in lightly with fork. Add water until pastry gathers around fork in soft ball. Roll out ⅛-inch thick on lightly floured board, cut 8 rounds. Press pastry circles on inverted, fluted pastry pans; trim edges. Prick pastry with fork; bake upside down in hot oven (450°F.) 12 minutes. Cool slightly, remove from pans. Cool thoroughly. Crush slightly, 2 cups strawberries; add SUCARYL and 3 tablespoons water; simmer 5 minutes; cool; drain off liquid and save. Place cooked strawberries in tart shells. Fill with remaining whole berries. Spoon liquid over berries.

Get your free copy of Abbott's "Calorie-Saving Recipes" at your drug store. It's a brand new edition with dozens of kitchen-tested ideas. Or simply write: Sucaryl, Abbott Laboratories, North Chicago, Illinois. In Canada: Abbott Laboratories, Ltd., 1350 Cote de Liesse Road, Montreal, Quebec.

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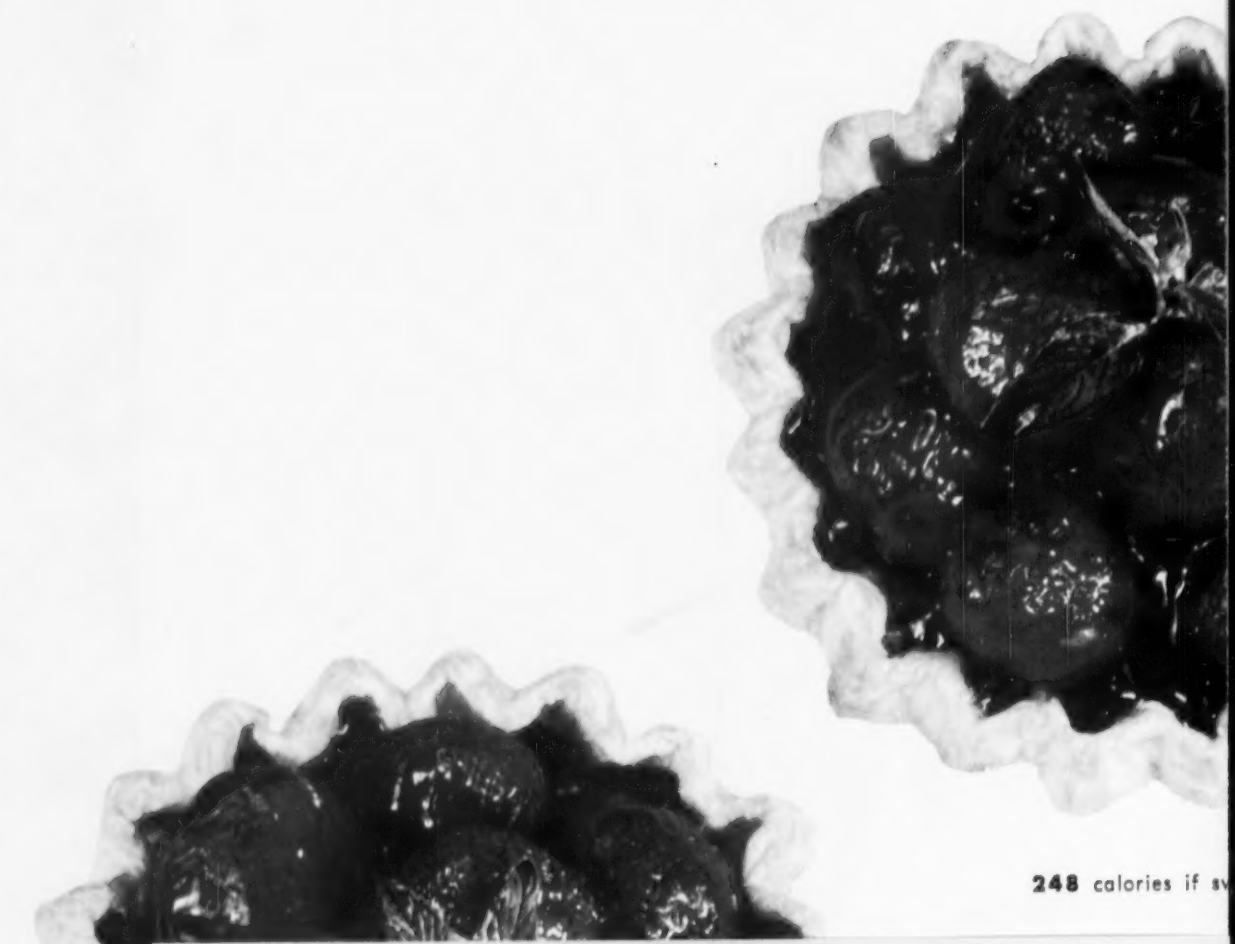
THE NEW, NON-FATTENING SWEETENER THAT TASTES JUST LIKE SUGAR

Available at your drug store in Tablet, Powder or Liquid form. For low-salt diets, ask for Sucaryl Calcium.



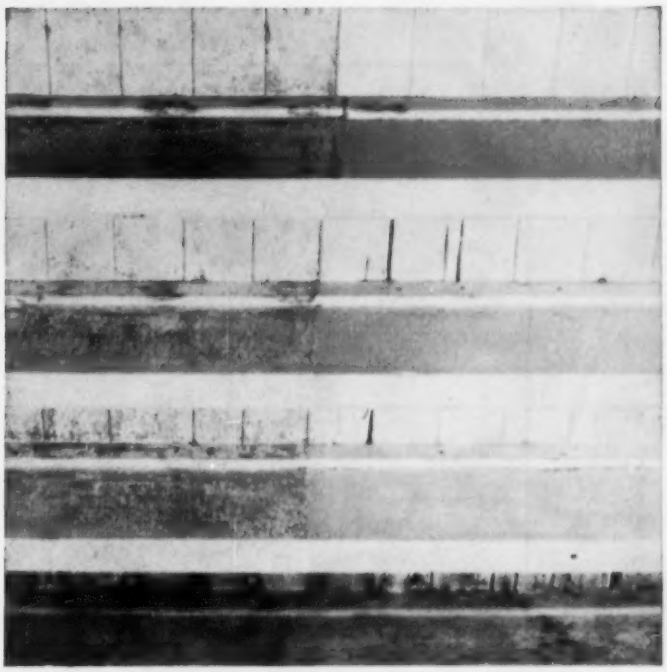
248 calories if s

This month,

NEW DU PONT ODORLESS MILDEW-RESISTANT ENAMEL

solves mildew problem in hundreds of food plants

Food-plant managers across the country have found that Du Pont Odorless Mildew-Resistant Enamel Oyster White retards the growth of most types of mildew on walls and ceilings. Formulated with solubilized copper-8-quinolinolate fungicide, Du Pont Mildew-Resistant Enamel is especially suitable for meat-packing plants, poultry and cheese plants, creameries and other areas where mildew presents a major problem. Tests prove that in most types of food processing plants it effectively retards mildew formation for months . . . eliminates the need for constant cleaning and scrubbing. And Du Pont Mildew-Resistant Enamel resists chipping and cracking . . . stays bright-looking month after month. What's more, when you consider the expense of constant cleaning, you'll realize just how economical this superior maintenance finish is. Mail the coupon today for complete information.



Photograph shows section of beamed ceiling in food-processing plant after three years' exposure. Lower strip: cleaned but left unpainted. Upper left: painted with ordinary non-fungicide enamel. Upper right: painted with Du Pont Mildew-Resistant Enamel.

Check these important advantages:

- √ **Effectively retards most types of mildew**
- √ **Cuts maintenance costs**
- √ **Odorless during application**

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Gentlemen:
Please send me, without obligation, free literature on how to combat mildew.

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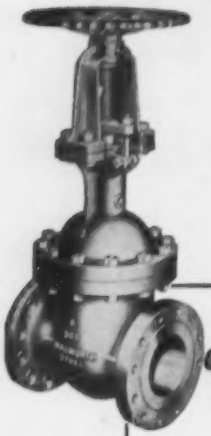
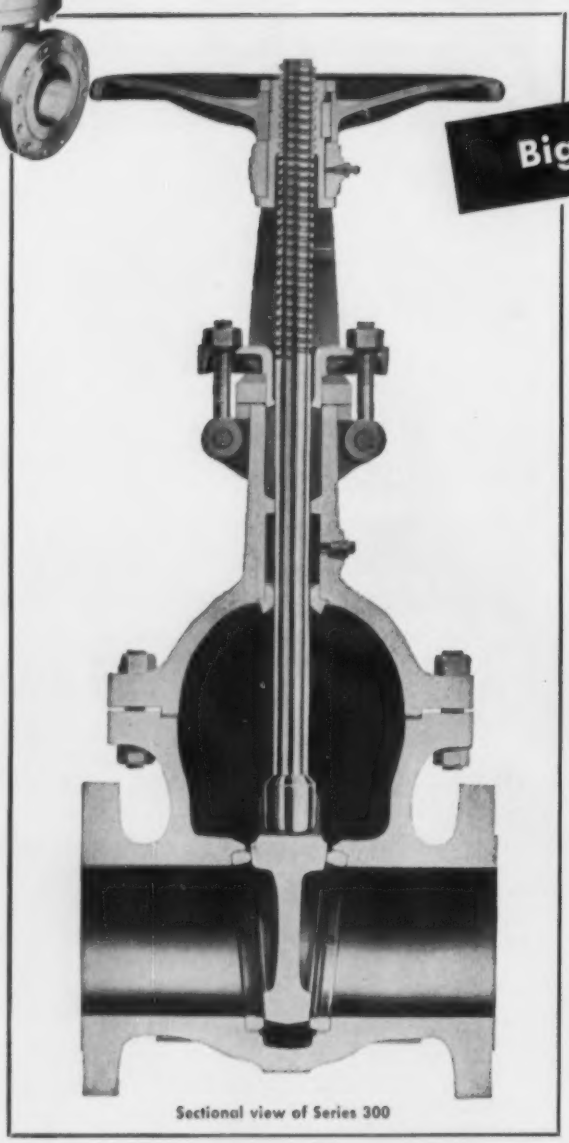
Series 150 and 300

Wedge Gate — Outside Screw and Yoke





Sectional view of Series 300

Big 8-Point Superiority!

Gland clearances are such that stem cannot be scored if gland should be tightened unevenly.

Deep Stuffing Boxes in all sizes (2″ to 24″) insure tightness and maximum packing life – costly leaks are eliminated.

Bonnets and Bodies are engineered to withstand pressure and minimize distortion – they're tough, durable, dependable.

Heavy Steel Walls provide extra strength and longer life.

Integral Body Guide Rib Faces are machined to insure accurate disc seating.

Seat Rings are bottom seated – not flange type. No recess exists at back of ring – hence no turbulence, erosion, or pressure drop.

Streamlined Ports allow high velocity, non-turbulent flow, and reduce the possibility of erosion.

Valves regularly have flanged ends. They can be supplied with ends for butt welding. Roller bearing yokes are available. On valves 5 inches and larger, by-passes can be furnished.

For Series 600 and higher, we recommend Walworth Pressure-Seal Steel Gate Valves.

For further information on Walworth Cast Steel Gate Valves, see your local Walworth distributor, or write:

WALWORTH

Manufacturers since 1842

valves • fittings • pipe wrenches

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Whether you prefer to lease or buy—you'll find the new acf built DURADOME is designed to move your liquid products more efficiently. For only DURADOME is improved *four* ways:

- **Dome base flued from top center section—provides greater strength and a smooth interior for easier cleaning...better application of lining.**
- **All tanks are of pressure-type construction (complete ring sections). This means heavier gauge steel *all* the way around for greater protection of costly ladings.**
- **Standardized all-welded underframe provides flexibility of use with tanks of *all* standard types and capacities...more economical maintenance.**
- **All-welded heavy gauge insulation jacket with one-piece ellipsoidal heads provides maximum insulating efficiency...streamlined appearance...virtually maintenance-free life.**

Whatever your tank car requirements are—contact your nearest Shippers' Car Line representative—for prompt service through a nationwide organization.

SYMBOL OF THE FINEST IN TANK CARS

Specialists for over 35 years in the leasing, operation, maintenance and servicing of tank car fleets—also exclusive sales agent of acf tank cars for industry.

SHIPPERS' CAR LINE SHPX

Shippers' Car Line Corporation

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CHICAGO, ILL. • HOUSTON, TEX. • SAN FRANCISCO, CAL. • MILTON, PA. • EAST ST. LOUIS, ILL. • SMACKOVER, ARK. • TULSA, OKLA. • NORTH KANSAS CITY, MO.

For more information, use coupon on last page.

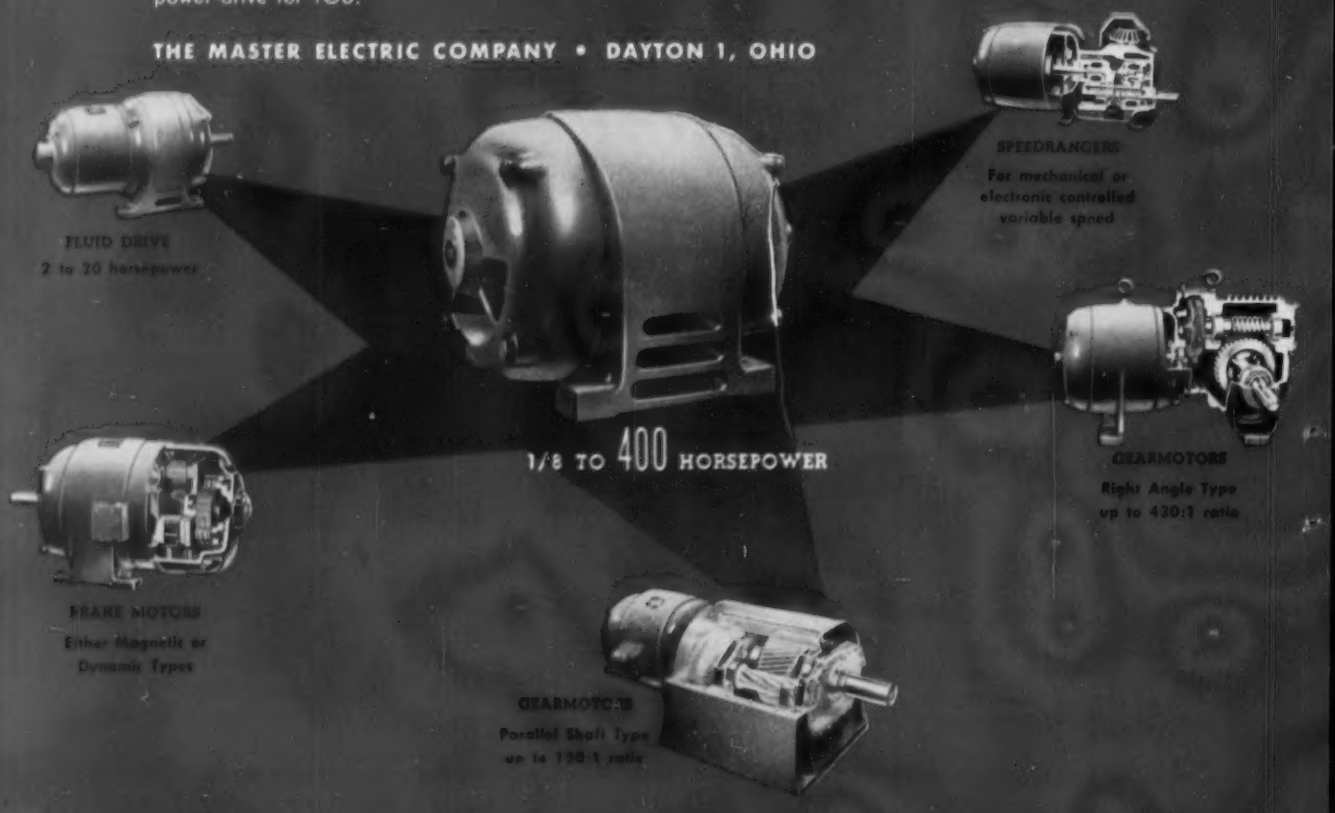
Whenever you select a power unit, don't put a straight-jacket on your ideas . . . consider ALL of the possibilities of modern power drives.

For example consider the many useful combinations that can be secured with the basic Master power units shown below. They're designed so they can be easily combined together to give you the RIGHT horsepower, the RIGHT shaft speed, the RIGHT features in one compact unit that you can use RIGHT where you want it. Nowhere else will you find power units that are so flexible, so easily adaptable, and in such a wide range of types and ratings.

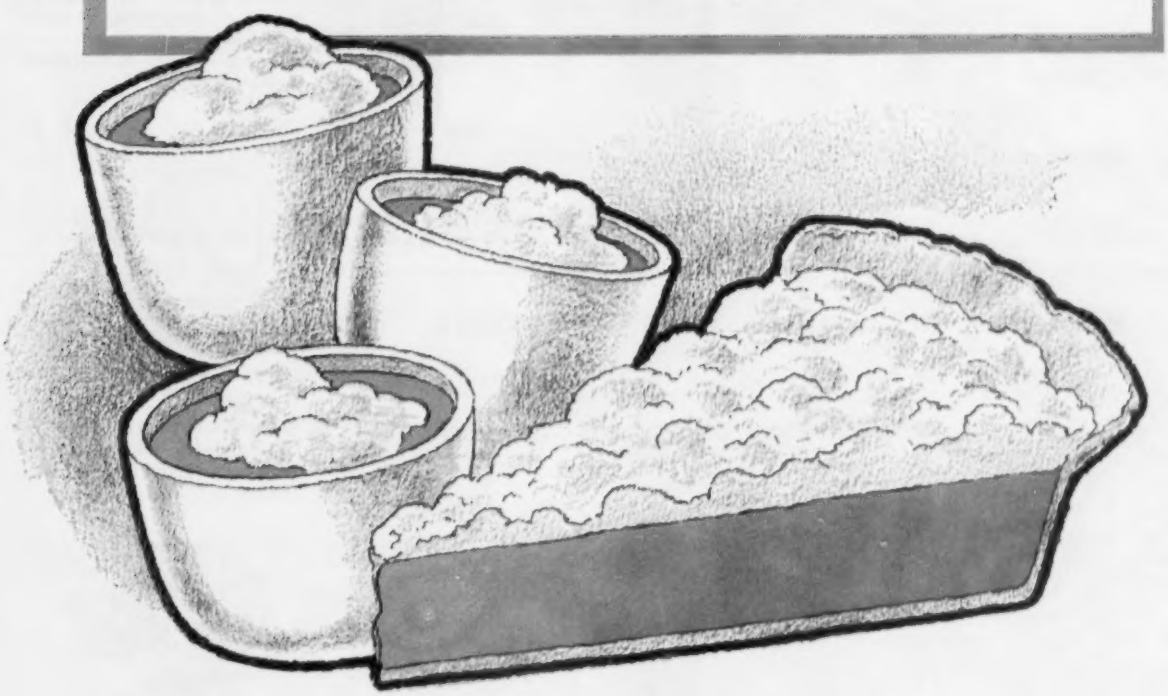
Master power drives are available in thousands and thousands of ratings (⅛ to 400 HP) . . . in open, enclosed, splash proof, fan cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 430 to 1 ratio . . . with electric brakes . . . with fluid-drive . . . with mechanical or electronic variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best power drive for YOU.

give your brains a chance

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO



FLAVORS for PUDDING POWDERS and PIE FILLERS



Why is today's housewife so enthusiastic about these popular corn starch pudding powders and pie fillers? For many good reasons: They are quick and easy to prepare, and they provide appetizing, nutritious, fine-textured, deliciously-flavored desserts at very low cost. All she has to do is add milk and water, stir or cook—a few minutes and her job is done.

The manufacturer's job of producing these products is easy, too — with the proper mixture of corn starch, sugar and vegetable gums, plus distinctive, rich, flavor-color combinations that require only simple mixing for uniform distribution throughout the powder base. Here are some of the special, long-shelf-life FRITZSCHE flavors that are helping to make new friends and new profits for dessert powder manufacturers everywhere:

OIL **CHOCOLATE** IMITATION #2
FRITZBRO **BUTTERSCOTCH** IMITATION #1
FRITZBRO **LEMON** CONCENTRATE
EKOMO **VANILLA** IMITATION
FRITZBRO **COCONUT** IMITATION #1 SPECIAL
FLAVOR COMPOUND #10538 **CHERRY** IMITATION
FLAVOR COMPOUND #10423 **PEACH** IMITATION
FLAVOR COMPOUND #10539 **BANANA** IMITATION
MODERN IMITATION FLAVOR BASE **WILD STRAWBERRY**
EKOMO **RASPBERRY** IMITATION
ESSENCE **ALMOND**
FRITZBRO AROME **MAPLE** IMITATION
OIL **CUSTARD** FLAVOR IMITATION
FRITZBRO **COFFEE** CONCENTRATE EXTRA
ESSENCE **CARAMEL** IMITATION #3

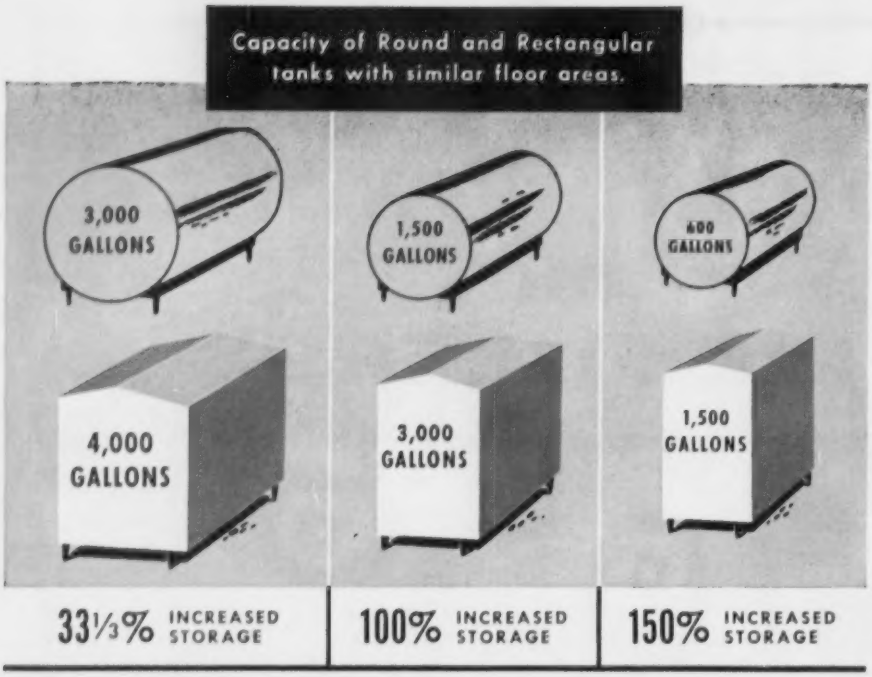
For test samples of these flavors, please address us on your letterhead specifying the flavors desired.

FRITZSCHE *Established* 1871 *Brothers, Inc.*

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES *and* *STOCKS: *Atlanta, Georgia, Boston, Massachusetts, *Chicago, Illinois, Cincinnati, Ohio, Cleveland, Ohio, *Los Angeles, California, Philadelphia, Pennsylvania, San Francisco, California, St. Louis, Missouri, *Toronto, Canada and *Mexico, D. F. FACTORY: *Clifton, N. J.*

For more information, use coupon on last page.



Why the economics of milk storage *point to Pfaudler rectangulars*

No matter how small or how large your milk storage requirements may be, you can get more capacity in a given space by installing Pfaudler stainless steel insulated rectangular storage tanks. You can reduce maintenance costs, too.

The illustration above tells the story on space saving. Tanks installed flush

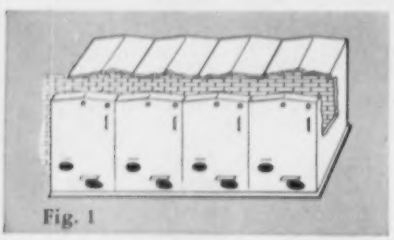


Fig. 1

to the floor (Fig. 1) automatically eliminate the extra work of cleaning under them. Savings of this type soon pay for your equipment, give you extra profit over a long period.

And that's just why Pfaudler rectangulars are so popular. *They are built to last.*

Take a look at Fig. 2. Note how these stainless steel tanks are reinforced. The base is made of 6″ girders

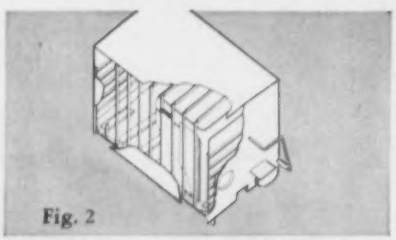


Fig. 2

and ¼″ steel plate. 2″ I-beams support sides and top. Heavy gauge 18-8 stainless steel with No. 4 polish completes the tank itself. Right here you have the answer to long service life.

Now to facilitate cleaning, every corner in the tank liner has an extremely large (3″) radius. The bottoms of all tanks slope toward the center for complete drainage.

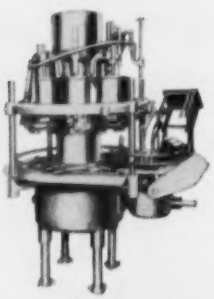
The agitator is Pfaudler's famous Stream-flo, and blending is actually better than in cylindrical tanks. Mounted lower, it keeps solids in suspension even when tanks are partially filled. All fittings are within easy reach.

These are some of the reasons Pfaudler rectangulars will help you make more money. Send for Bulletin 922.

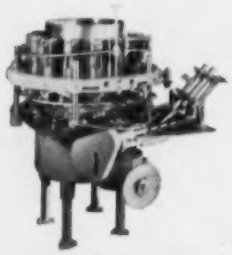
The world's fastest, cleanest fillers

As many as 800 cans a minute—sometimes even more—can be filled with Pfaudler Rotary Piston Fillers. Five models are available to handle sizes from 1 ounce to an imperial gallon. Three of these are shown below.

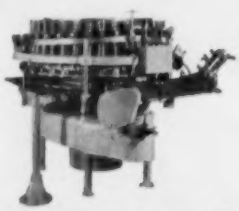
Accuracy of fill, ease of adjustment, one-man cleaning are some of the features which give you greater production at less cost. Send for Bulletin 911.



FOR BIG CONTAINERS, Model RP-7 has typical Pfaudler convenience features, handles capacities up to 5 quarts.



14-STATION FILLER, Model RP-14, has no-can-no-fill device, as do all four other Pfaudler filling machines.



"WORLD'S FASTEST FILLER," RP-35 has special features, including electric brake that stops rotation in 2/10 of a second.

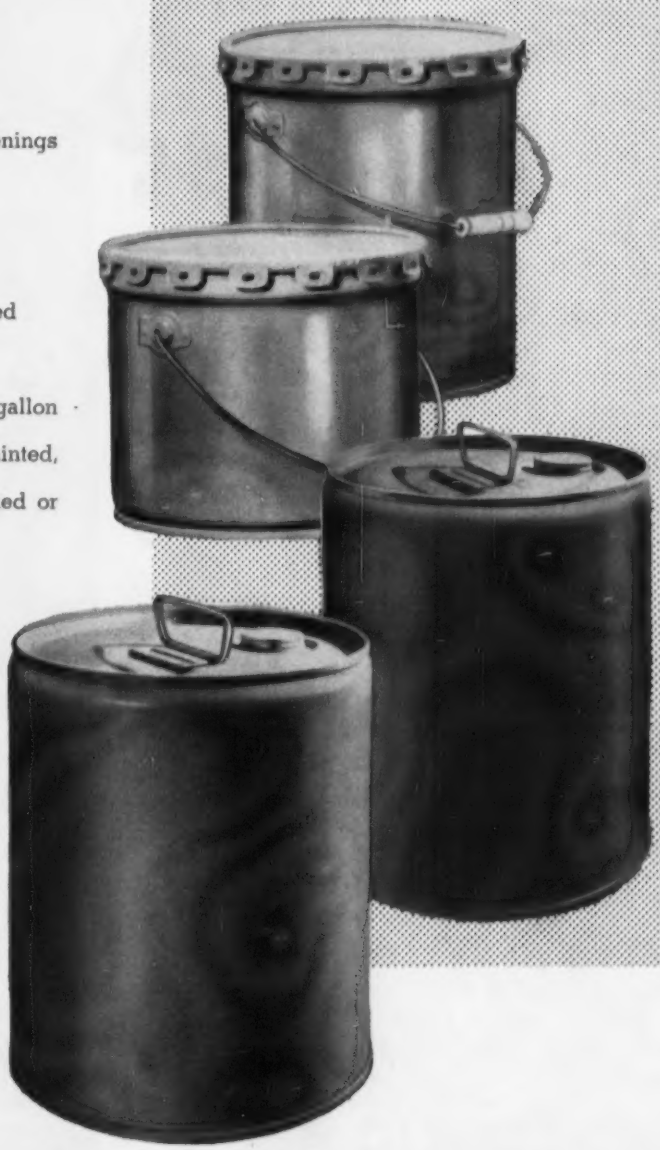
THE PFAUDLER CO. **Rochester 3, N. Y.**

USS Steel Pails

- Available in 3- to 6½-gallon capacities
- With tight heads or lug covers
- Wide variety of pouring spouts and openings
- Baked enamel finishes in any color combination
- Lithographed heads or shells as required

We also have steel drums of 15- to 55-gallon capacities which can be furnished painted, decorated, hot dipped galvanized, tinned or made of stainless steel.

"It's Better to Ship in Steel"



A USS STEEL CONTAINER FOR EVERY INDUSTRIAL NEED!

UNITED STATES STEEL PRODUCTS
DIVISION
UNITED STATES STEEL CORPORATION
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UNITED STATES STEEL

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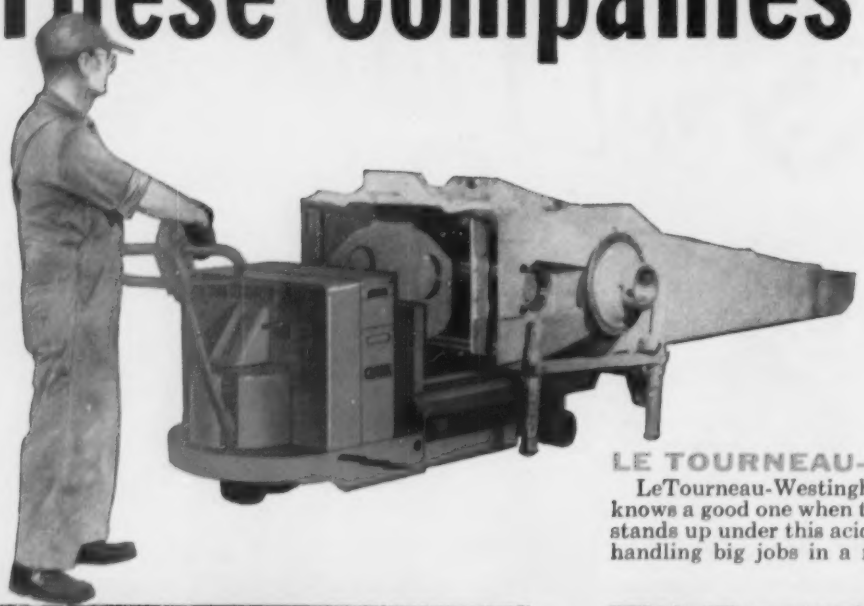
These Companies Chose



LE TOURNEAU-WESTINGHOUSE

LeTourneau-Westinghouse makes machines . . . knows a good one when they see it. The Powrworker stands up under this acid test—takes top honors for handling big jobs in a minimum of space.

JEWEL TEA

Here's real ease of steering. Wide spacing of Powerhead mounting-points assures positive alignment—minimizes deflections due to uneven surfaces. Result! Easy steering.

ASSOCIATED TRUCK LINES

Take the case of a low dock—where the machine has to climb. With a series wound, high torque type motor and a double reduction spur gear powertrain, the Powrworker is tops for gradability.

ABBOTT LABORATORIES

Here Powrworkers handle fragile glass vials containing drugs. New Powrworker *Micro-Matic Control Valve* gives smooth, controlled hydraulic action —eliminates danger of damaged material.

VERSON ALLSTEEL PRESS CO.

Moving heavy loads, the Powrworker's electrically welded "structural unit" frame stands up under the toughest of assignments. Assures maximum equipment availability under the most severe conditions.

POWRWORKER POWER

HERE'S WHY!

WHITE MOTOR SALES

For faster operations, controls on Powrworker *Stacker* are simplified and placed for operator's convenience. Stationed near top of truck, controls are fast and simple to service.

JOHNSON'S WAX

Best way to increase production is to do two jobs at once. Operator can conveniently control travel lever and lift button with one hand—make a fast operation out of any handling job.

MILNOT
MILNOT
MILNOT

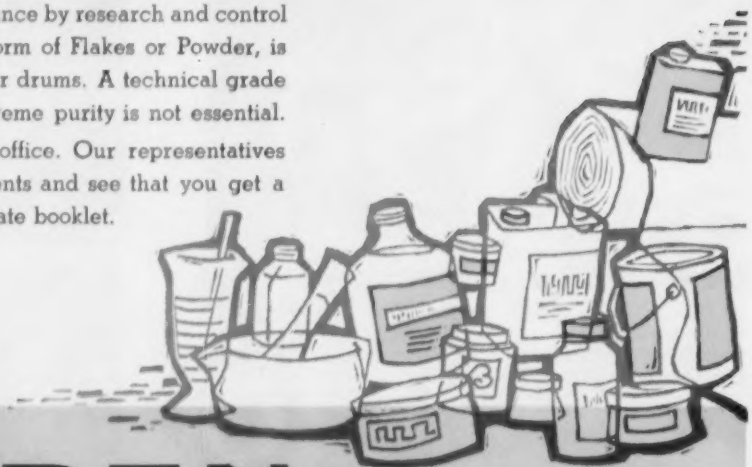
Protect the high quality of your product

with Heyden
SODIUM BENZOATE

Since all foods and beverages may contain bacteria or molds in varying amounts, a threat to the quality and reputation of your product is always present. To protect flavor, freshness, appearance and taste, Heyden Sodium Benzoate can be used as a safe, effective preservative. It's economical insurance; just 1/10 of 1% will help keep margarine, soft drinks, jellies, juices, condiments and other products from spoiling.

Heyden—a long established producer of Sodium Benzoate—maintains highest purity and uniformity through modern specially designed equipment and close surveillance by research and control chemists. The U.S.P. Grade, in the form of Flakes or Powder, is available in 100, 50 and 25 pound fiber drums. A technical grade is supplied for applications where extreme purity is not essential.

Contact the nearest Heyden sales office. Our representatives will be glad to discuss your requirements and see that you get a copy of our informative Sodium Benzoate booklet.



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CHEMICAL CORPORATION

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FINE HEYDEN CHEMICALS

Benzaldehyde • Benzoic Acids • Benzyl Chloride • Beta-Oxynaphthoic Acid • Chlorotoluenes • Creosotes • Formaldehyde • Formic Acid • Guaiacols
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TAPER-LOCK

A PATENTED PRODUCT OF DODGE

Hard job made easy!

Just a few turns of that little wrench and the Taper-Lock bushing loosens—the sheave slips off the shaft without a struggle. No hammer, no crowbar, no shock to bearings or machinery! Taper-Lock is easiest, quickest to mount—easiest, quickest to remove—yet it holds to the shaft with the firmness of a shrunk-on fit. The Taper-Lock bushing seats evenly along the entire length of the hub.

There is no collar—no protruding part—no flange to prevent uniform compression. Taper-Lock Sheaves always run true. Taper-Lock Sheaves are available from Distributors' stocks in a complete range of sizes in A-B combination, B, C, and D grooves.

DODGE MANUFACTURING CORPORATION, 2800 Union St., Mishawaka, Ind.

THERE'S ONLY ONE TAPER-LOCK, THE BUSHING THAT MOUNTS FLUSH!

Standardize, economize with Taper-Lock, the bushing that is interchangeable in Dodge sheaves, sprockets, couplings and conveyor pulleys. *More than 2,000,000 in use!*

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

DODGE

of Mishawaka, Ind.

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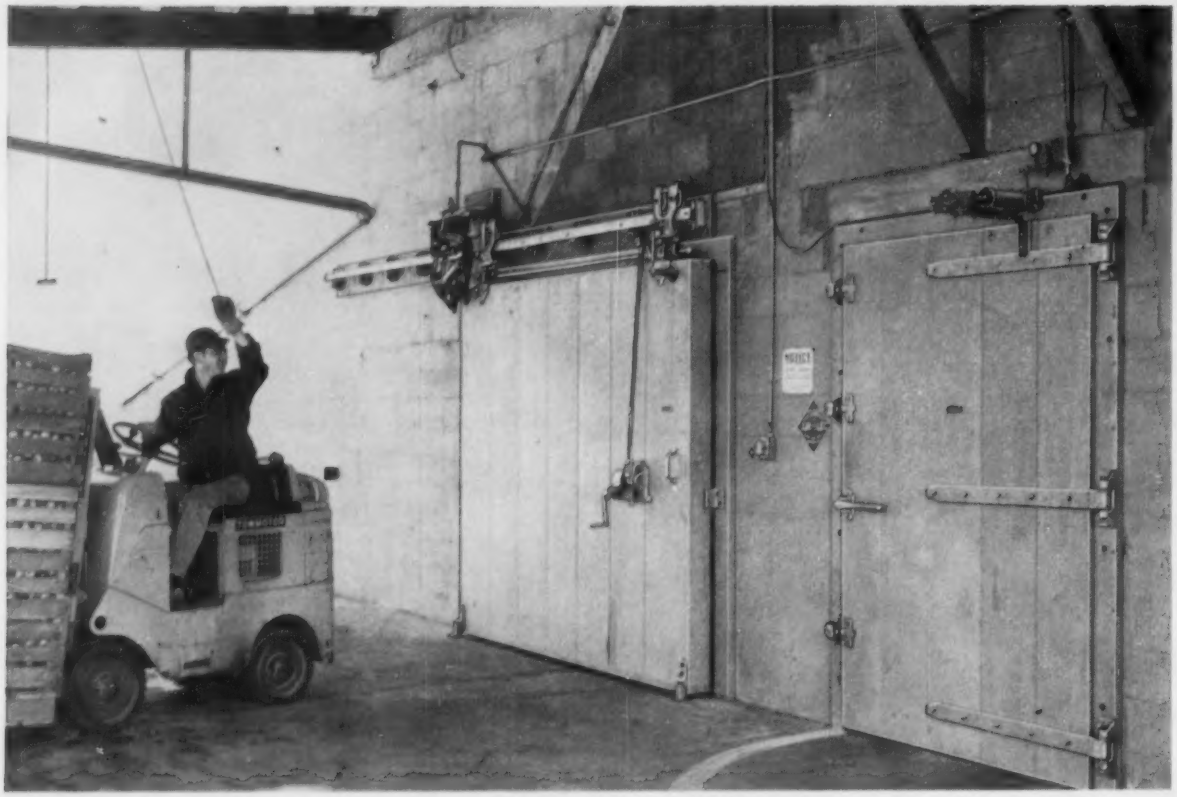


Jamison Horizontal Sliding Door saves space on the loading dock. Remote power operation saves operator time and effort.

Power Operation of JAMISON Doors Speeds Handling for Food Processor

Ample width of metal clad Series "50" door opening allows adequate clearance for truck and load.

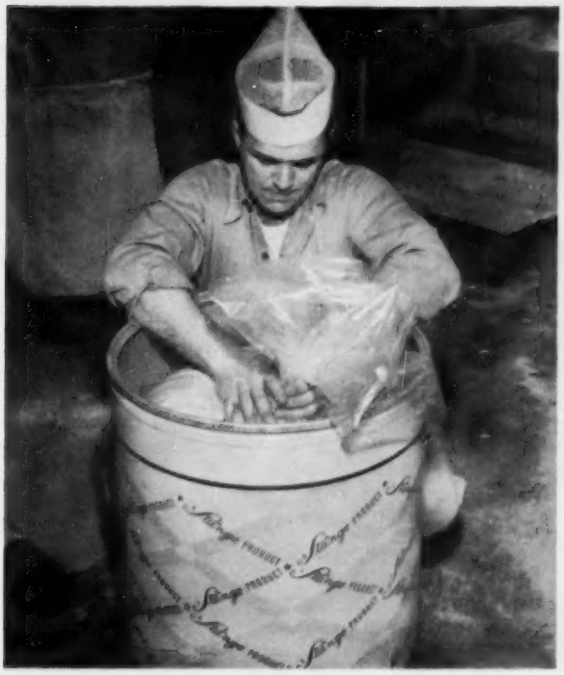
C. H. Musselman Co., producers of food products at Biglersville, Pa., selected Jamison Doors for their apple cold storage. This gave them the efficient insulation and effective seal of Jamison door design. For rapid, automatic operation, both doors are equipped for remote power operation which saves time, and effort.

Count on Jamison Doors to solve your particular problem. Consult your architect or write direct to Jamison Cold Storage Door Company, Hagerstown, Md., U.S.A.

JAMISON
HAGERSTOWN, MARYLAND, U. S. A.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.

ANOTHER WAY it pays to package in film made of BAKELITE Polyethylene



Polyethylene liner protects contents against caking due to moisture, and loss of valuable oils.

Ease of re-closing polyethylene liner maintains package tightness and is a great advantage.

Flexible Packaging Company, Chicago, Ill., made the polyethylene liners of queen film produced by **The Visking Corp.,** Terre Haute, Ind.

"...a completely dependable packaging method"

"We know it will retain all of its flavor quality." The product in this case is food flavorings and spices made by the Wm. J. Stange Company, Chicago, Ill.

It is a sensitive product. According to F. K. Koepke, assistant sales manager, "we cannot live with anything less than a completely dependable packaging method. First, we must keep moisture out, and second, loss through absorption by the container itself of flavor-giving oils must be minimized."

Using a polyethylene liner, "we seal every bit of our laboratory flavor and spice right where we want it. More than this, the liner protects flavor at the customer's location – generally kitchens subject to high humidity and heat. Both conditions can affect our products. However, polyethylene has been successful in protecting our products until actually used. The added cost over an unlined container is so small compared with the advantages that it is not even a consideration."

Flexibility. Easy sealing and re-closing. Chemical inertness. Brand identification. Availability and economy. These are a few of the important benefits of packaging in film made of BAKELITE Brand Polyethylene. Call your packaging supplier.

SPECIFY FILM MADE OF

BAKELITE
BRAND
Polyethylene Plastic

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

NOW! Lowest Prices!

Highest Powered Dodge Trucks Ever Built!

LOWEST PRICES! Many standard models of Dodge trucks are priced lower than all other makes! Yet with these low prices, quality-built Dodge trucks are dependable as ever.

HIGHEST POWER! Power-Dome V-8 engines, with 169 to 202 hp., are the most powerful of any leading trucks. Save time, save on operating costs, with these short-stroke V-8's! You'll save with Dodge thrifty 6's, too!

THE FORWARD LOOK! Now Dodge brings the Forward Look to trucks. New wrap-around windshield (biggest of any make!) means added visibility and safety! More reason why you should look at Dodge before you buy any truck. Why not phone your dependable Dodge truck dealer, today?

DODGE *"Job-Rated"* TRUCKS WITH THE *FORWARD* LOOK!

For more information, use coupon on last page.

BULK SWEETENER HANDLING SPEEDS PRODUCTION, CUTS COSTS

Sweetose Syrup, piped directly from your storage tanks, travels in a closed, sanitary system. A meter measures just the right amount of sweetener, then stops the flow automatically. This automatic handling system stops "manhandling" of sweeteners, improves quality control, cuts costs. See about automatic handling in your plant now.

Sweetose *never* masks a flavor!

Crystal clear, Sweetose syrup brings out full, fine flavor, retains natural color, improves texture.

Want to give your processed foods a real profit-building competitive advantage? You can . . . with easy-to-use Sweetose, Staley's enzyme-converted corn syrup. Used with sucrose, Sweetose gives accurate sweetness control that means well-balanced, unmasked, delicious flavors. This remarkable liquid sweetener helps retain fresh, natural color and body and greatly improves the eye appeal of your products. Try Sweetose in your products soon, and prove its sales-building advantages to yourself. See your Staley representative or write us direct for more information.

Sweetose®
SYRUP

A. E. Staley Manufacturing Company, Decatur, Illinois

PRODUCTS FROM CORN
Staley's
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OTHER QUALITY PRODUCTS

Regular, Intermediate Corn Syrups
Canners Starches
Refined Corn Oil
Zest®, Monosodium Glutamate
Sta-Sol® Lecithin

For more information, use coupon on last page.

Better, Cheaper Drying

with Taylor in control at New Mill Noodle and Macaroni Co.

CASE HARDENING, and resultant cracking or checking, is no problem for New Mill Noodle and Macaroni Co., Chicago, Illinois. Drying is much more reliable and no operator attention is required.

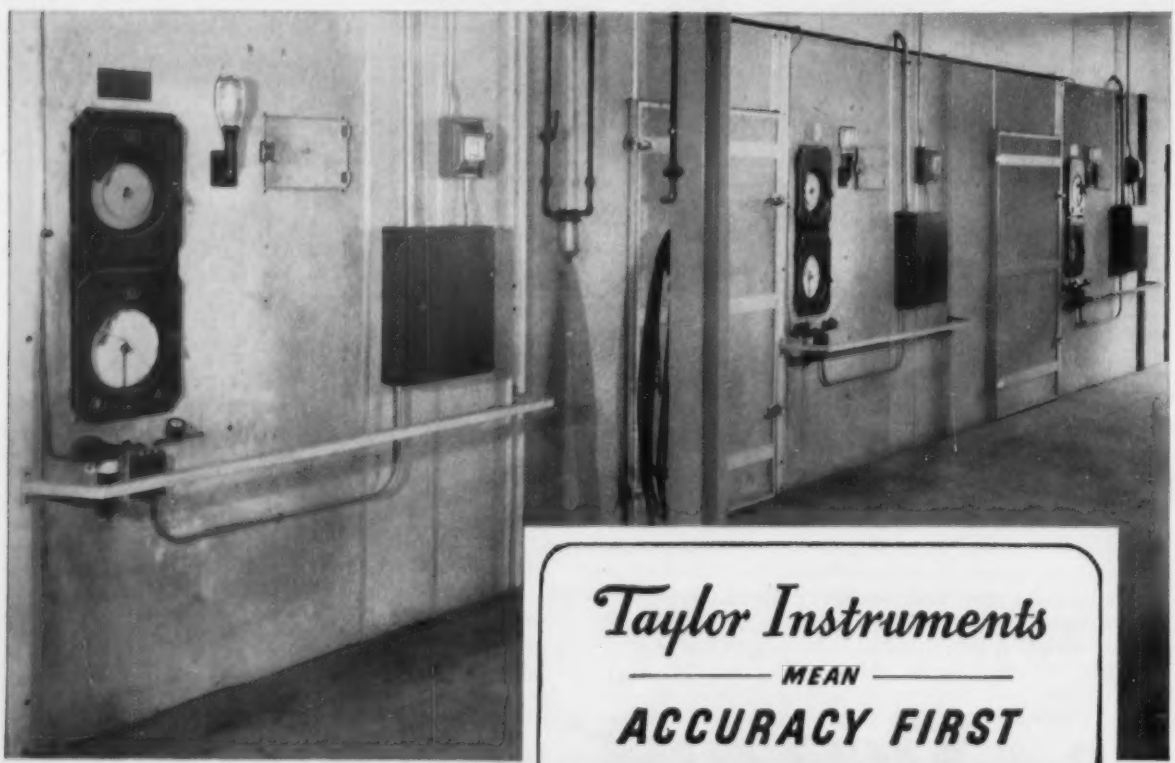
The secret is the use of a modern dryer, designed by the Glenn G. Hoskins Co., Libertyville, Ill., and an accurate wet and dry bulb temperature-humidity control system supplied by Taylor Instrument Companies. The Taylor system utilizes a FULSCOPE* Time Schedule Controller, which automatically controls both dry and wet bulb temperatures *with an accuracy within* ½° F. according to a pre-determined schedule. An "interrupter-timer" adjusts total length of the drying schedule from a minimum of 12 hours to an infinite time.

A time-schedule controller is desirable for batch drying operations, since it is necessary to start the drying with a low depression (high humidity), or small difference between dry and wet bulb readings. Drying then proceeds at stages determined by the instrument cam schedules, to the point where the depression is quite large, and drives the finished moisture of the product down to the required level of 10 to 11½%.

This system saves money for New Mill in two ways. **1.** It insures a uniformly dried product. **2.** It reduces operator attention time very considerably—for instance, a night crew is unnecessary.

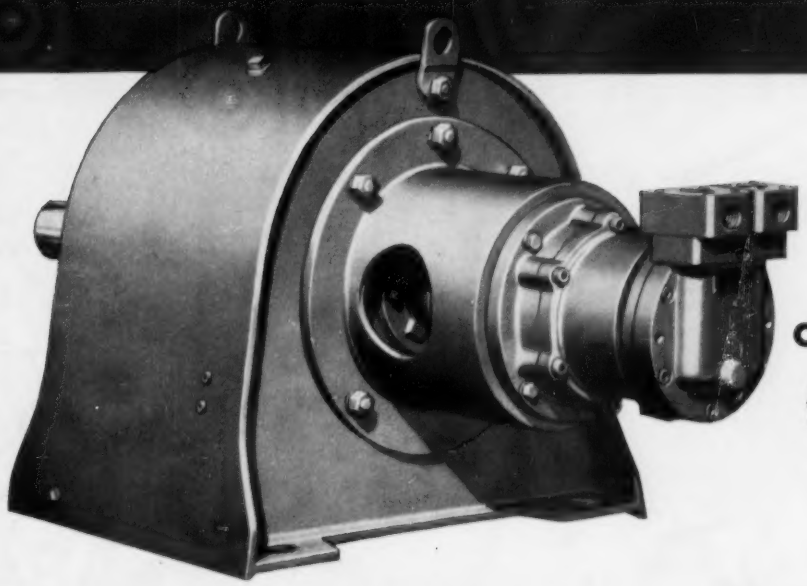
Consult your Taylor Field Engineer for full details about this and other cost-cutting Taylor systems. Or write for information to Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

*Reg. U.S. Pat. Off.



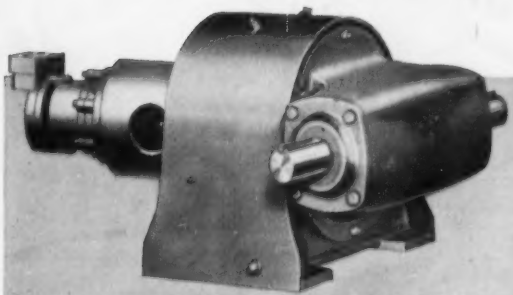
Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

NOW! NEW OILGEARDUCERS



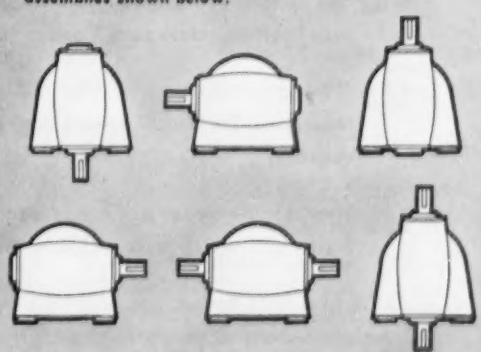
Offering for the first time compact, packaged, fluid power output drive units!

● Oilgearducers are new integral output drive units combining Oilgear Fluid Power axial piston motors and Falk All-Steel Reducers. There are horizontal and vertical models, concentric and right angle types and single, double, triple and quadruple reduction. Now, for the first time you can get a complete, easy to install, "ANY-SPEED" output unit for your high torque, low maximum speed drives. When used in combination with Oilgear Fluid Power Pumps, these reversible Oilgearducers provide infinite variability of speed, absolutely controlled rate of acceleration and deceleration, smooth and swift reversal, cushioned braking. All these together with major economies in motor, circuitry and power requirements. This new Oilgearducer "Any-Speed" output unit is available in sizes from 1 to 20 h.p. It is unequalled for applications as diverse as can-filling, paper machines, centrifugals, cable wrappers . . . and in automation or feed back applications where synchronization is an absolute necessity. Write now for new bulletin 56610. THE OILGEAR COMPANY, 1580 West Pierce Street, Milwaukee 4, Wisconsin.



RIGHT ANGLE OILGEARDUCERS

Oilgearducers with right angle output shafts are available in ratios ranging from 5 to 1500: 1. In assemblies shown below.



Write for this new Bulletin 56610

OILGEAR

PIONEERS...NOW THREE PLANTS FOR FLUID POWER

PUMPS, MOTORS, TRANSMISSIONS, CYLINDERS & VALVES

True Fruits

IN EVERY SEASON

ALVA natural fruit flavors have a reputation for better taste and better utility for these reasons:

1. **Most of our true fruit extractions are processed through essence recovery distillation equipment built to our own specifications. This special processing assures the retention of even more of the light fugitive esters so difficult to hold in normal extraction procedures.**

2. **Storage facilities are maintained under ideal control conditions, improving the life of flavors and guaranteeing freshness in each delivery.**

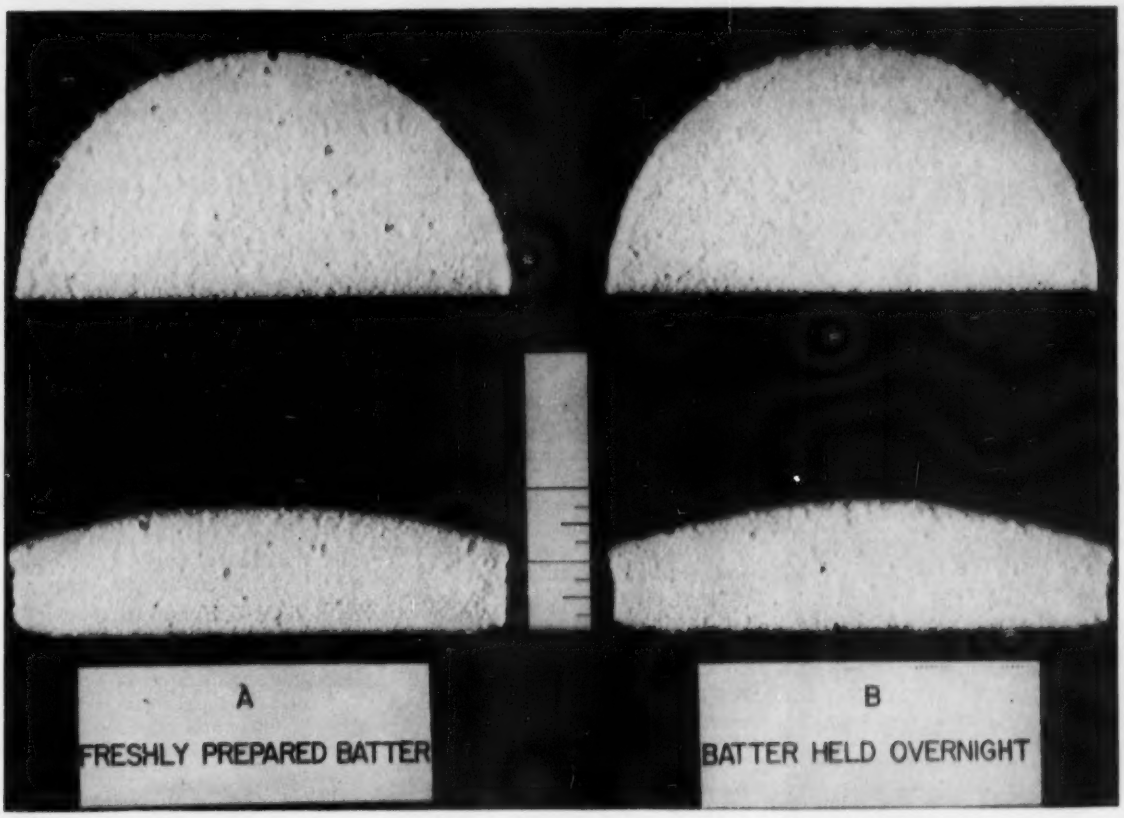
3. **Through the years ALVA has developed procedures for handling fresh fruit which assure 100% purity.**

ALVA true fruit flavors are ideal for every use, and the ALVA laboratories are eager to help with recommendations and samples for every true fruit problem.

VAN AMERINGEN-HAEBLER, INC.

521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva FLAVORS



CAKE VOLUMES are just as good—whether batters containing new stabilized dicalcium phosphate are baked immediately after preparation (A) or after overnight storage (B). New leavener reacts with soda only upon heating.

New Leavener *Triggered by Heat*

★ It's alkaline when mixed into cake batters, then turns acid in the baking to release cake-structure-building CO_2 from the soda.

★ And this agent bids fair to answer the elusive question of leavening frozen cake batters and dry mixes

ROBERT P. JOSLIN and JOHN V. ZIEMBA

Respectively, Food Technologist, Food Applications Research Laboratory, Monsanto Chemical Co., Dayton, Ohio, and Associate Editor, "Food Engineering"

A chemical leavener exhibiting a remarkable chameleon-like versatility is the latest disclosure of research.

Specifically introduced by this new agent are very favorable possibilities for adding water and otherwise mixing batters completely, then storing them, as needed, for varying periods—with adequate leavening power retained throughout for baking.

Further, the agent has the unique property of being slightly alkaline at ordinary temperatures while on the other hand showing acid qualities upon application of heat.

Its potentialities in the baking field are, then, significant. It may unlock the door to development of a new line of consumer convenience items—refrigerated or frozen cake batters. And this may provide a possible new marketing channel for excess mixing capacity of the commercial baker.

Or the dry-mix maker may want to carry his product one step further to provide a "no homework" convenience product which the housewife need only bake.

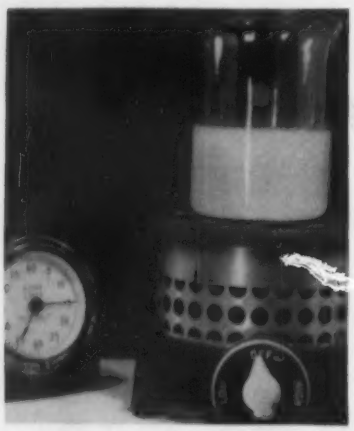
The new leavener is a stabilized form of dicalcium phosphate introduced by the Inorganic Chemicals Division (Dayton, Ohio) of Monsanto Chemical Co. (which has made application for a patent).

Special-Purpose Leavening

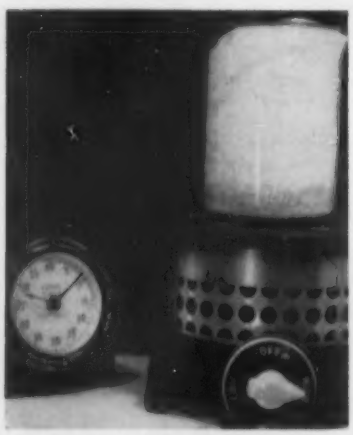
Research into leavening systems has now made it possible to meet almost any demands for special properties.

How Heat Starts It

NEW LEAVENER is poured into beaker of bicarbonate solution, and stop watch is then started.



WITH NO HEAT on burner for 35¼ min., there's no reaction between leavener and bicarb. Heat then goes on and—



—UP she bubbles 14 min. and 8⅛ sec. later—demonstrating this new leavener's salient property.

Most of these chemical leavening systems are based on a breakdown of a bicarbonate into carbon dioxide gas and reaction salts. Heat alone will release the CO_2 gas from bicarbonate of soda, but generally not at the right time. And soda alone has the disadvantage of leaving reaction products that are so alkaline that they cause an undesirable flavor.

To speed CO_2 release and to provide more neutral reaction products, various acidic materials are used. These soda-acid mixtures constitute the chemical leavening system.

Any acidic material used in the right ratio with bicarbonate could suit the requirement for neutral reaction products. But many acids would react so fast that, with some batters and doughs, most of the CO_2 would be lost before proper mixing or shaping.

Also, because of toxicity and flavor requirements, as well as the convenience of having dry-form leavening, selection of suitable acids has narrowed. Included are a few organic acids such as tartaric or its monopotassium salt, sodium aluminum sulfate for limited applications in double-acting baking powders, and principally the various acid salts of phosphoric acid.

Phosphoric acid has three replaceable hydrogen ions. Replacement of one of these hydrogens by reaction with lime still leaves a rather acidic material, monocalcium phosphate, which crystallizes under normal conditions as monohydrate [$Ca(H_2PO_4)_2 \cdot H_2O$].

Rate of reaction of monocalcium phosphate on the bicarbonate may be slowed by delaying its rate of solution. This is accomplished in existing proprietary preparations by use of coatings of less soluble phosphate salts.

Another approach to delayed reaction rates is to use an acidic pyrophosphate salt such as sodium acid pyrophosphate. Reaction rate of this latter material can be governed to some extent by various manufacturing methods.

Each of the resulting leavening acids fits a special need. For example, in a rapidly prepared batter, such as a pancake batter, an uncoated monocalcium phosphate may serve the purpose. For biscuits, where time must be allowed for rolling and cutting by the housewife, the coated monocalcium phosphates have proved satisfactory.

For the more extensive manipulations and mixing times facing the commercial baker, the special requirements are best met by the sodium acid pyrophosphates. Other applications require the special characteristics of one or the other of these materials, or of blends, to fit mixing operations or to give certain desirable qualities to the baked product.

Another example is found in the prepared cake mixes, which are made by various blendings of the calcium acid phosphates (for tight grain structure and good pan-release) with the sodium acid pyrophosphates (for more open cake textures).

New Problems Solved

Possibility of marketing completely prepared cake batters through refrigerated or frozen food channels has created a special need not met by previously recognized leavening agents.

All of the latter reacted with the bicarbonate during mixing, and some continued to react during storage—result being insufficient leavening-gas release during the baking and the setting of the dough structure.

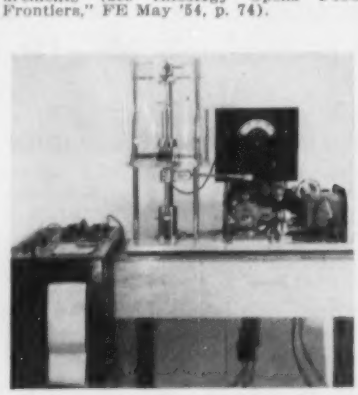
Studies were thorough.* A check of the chemical characteristics required suggested using a phosphate salt in which two of the three potential acid groups already had been reacted.

This approach led to the stabilized dicalcium phosphate which, as noted, is unique—being slightly alkaline at room temperatures or below, but reverting to an acid upon heating in solution.

When used with sodium bicarbonate in the proper ratio (about 3 parts dicalcium phosphate to 1 part bicarbonate), the baking reaction products are neutral (Fig. 1) and produce desirable characteristics in the finished baked product.

The radically different leavening performance of this material caused it

* In the course of its comprehensive investigations, Monsanto made pertinent use of its "resonance elastometer" (photo) in making the necessary rheological measurements (see "Rheology Opens Food Frontiers," FE May '54, p. 74).



THIS advanced "resonance elastometer," developed by Monsanto researches, precisely and automatically recorded data on the food-product reactions.

to be overlooked in early screening tests, in which leavening acids were substituted in standard formulations and subjected to baking evaluations without special regard for unique properties.

For example, trial-and-error tests in which biscuits were baked with dicalcium phosphate and soda resulted in rather poorly leavened, but neutral, biscuits.

However, when this biscuit baking test was examined objectively by chemical means, it was noted that in spite of poor leavening, as judged by expansion, all of the bicarbonate had been reacted prior to completion of baking.

Construction of a plot (Fig. 2) showing the rate of CO_2 release as a function of mixing and baking time, plus inclusion on this plot of a "set or coagulation range" indicated that gas release was too late to properly expand the dough.

Examination of this plot indicated that to make this product work it would be necessary to speed up the rate of CO_2 release in the oven or to delay the coagulation until the leavening gas had been released.

The latter condition is essentially the case in cake batters (Fig. 3) which, largely due to greater sugar content, coagulate at a somewhat higher temperature than biscuit batters. In addition, cakes are baked in a relatively slow oven, thereby allowing more time for the leavening reaction to take place.

Formulation Changes

Cake mixes and other baking formulations have been developed over the course of years to adapt one ingredient to another. All of the leavening systems used for these mixes were relatively conventional, as compared

(Turn to page 184)

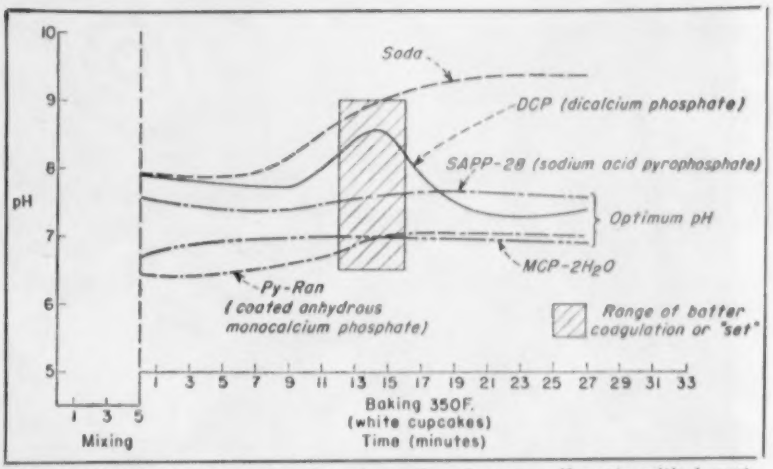


FIG. 1—WHEN dicalcium phosphate is used as leavener (3 parts with 1 part soda) in white cupcakes, baking reaction products are neutral, and cakes are finished to desired properties.

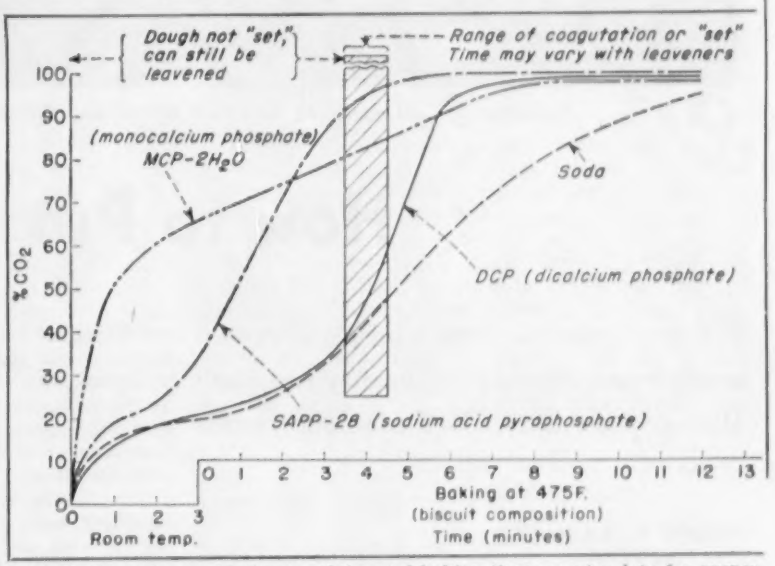


FIG. 2—CO_2 release, relative to mixing and baking time, was too late for proper expansion of biscuit dough. Needed to make new leavener work, in this case, is speed-up of gas release in oven or delay in setting until release of leavening gas.

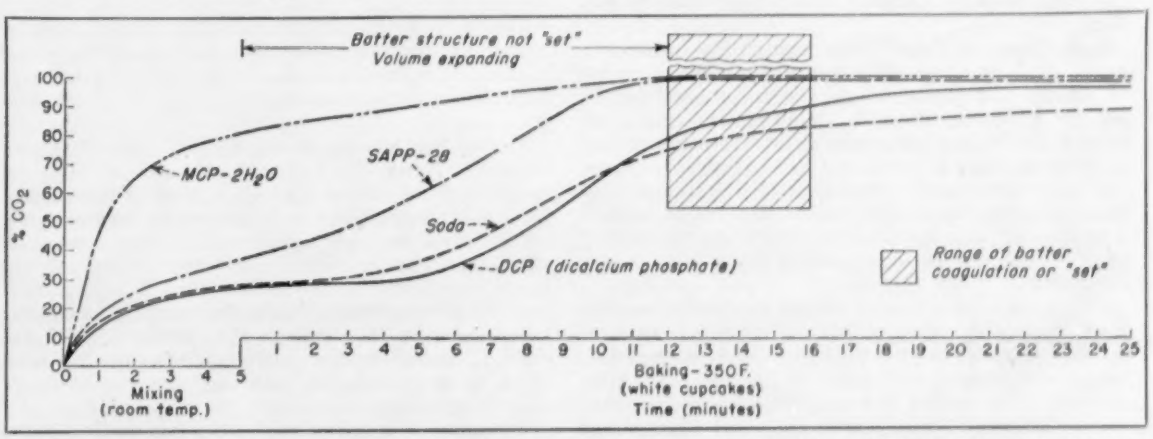


FIG. 3—ESSENTIAL to baking of cupcakes with new leavener is the delay in coagulation until leavening gas is released. Cake batters have more sugar than biscuit batters and coagulate at higher temperatures. Cakes must be baked in slow ovens to permit more time for leavening action.

Audience is "all ears" as speakers reveal case-history information . . .

How to Put Package Fill

Practical pointers from food plant experience given at recent clinic held by American Management Assn. Methods and results revealed

FRANK K. LAWLER
Editor, "Food Engineering"

Practical pointers on the all-important problem of more closely controlling package fill were presented at a recent clinic sponsored by American Management Assn. in New York.

Federal and state regulations came up first on the program. And recent developments toward better control of family flour package weights were pointed up by Sumner C. Rowe, Food & Drug Administration, and John B. McBride, Commonwealth of Massachusetts Department of Labor & Industries.

In a survey covering 44 jurisdictions, weights and measures authorities found the average net weight of 5-lb. flour bags in retail stores to be 4.96 lb. due to moisture loss. Yet the mills had over-packed by 0.04 lb. on the average.

Mr. Rowe quoted this significant statement from *The Hook-Up*, a publication of Millers National Federation: "The outcome of a recent survey of family flour package weights establishes very definitely that a great many members of the milling industry have a job to do in their own establishments with respect to correct flour package weights. We are very much afraid that in all too many mills the equipment is inadequate and out of date, the supervision is insufficient, and the practice careless . . . the result is that too many packages are under the stated weight at the time of packaging."

Commenting on slack fill, Mr. Roe said that the space in the package occupied by the total contents should, in general, be more than 90%. But the packer should fill the container as full as commercially practicable to comply with the law.

Mr. McBride warned that "you must have the proper weighing and measuring equipment, properly installed to do the work, and there should be sufficient frequency of checking the accuracy of these devices.

What Nestle Does with SQC

How to put filling operations under statistical quality control to minimize variations was discussed by several speakers. Emphasis was placed on the strong trend to such control in the food industry, and on the dollars-and-cents benefits.

Francis X. Donohue, Head, Quality Control Department, The Nestle Co., Fulton, N. Y., said that SQC was as much a tool of management as standard costs. And while not a cure-all, the technique reveals manufacturing operations as they are and facilitates improvement in efficiency. However, 100% cooperation of top management is essential.

In a 5-filler operation, Nestle decreased the variance in case weights by 38% through SQC methods. Each machine is controlled, then production from the five units is combined in each case to average out individual machine and package variations.

Frequency of sampling weights depends on the stability of machine performance. Nestle finds it adequate to take a sample every 10 min., four cases at a time.

It is not difficult to apply SQC to packaging, Mr.

. . . at clinic run by John Warren, AMA

Under Control

Donohue pointed out. Only a basic knowledge of the technique is required. The real problem is to establish the variable pattern. Sample size and frequency are determined by experience.

And a word of caution: Mr. Donohue said that it is easy to develop a highly refined control system which is expensive and not worth the cost. A little thought can avoid this. Nestle has reached a state of control approaching the inherent variability for the machines and has saved substantial amounts of money.

G. Washington Uses Data Device

Application of SQC to soluble coffee packaging was described by Howard Allcock, Director of Quality Control, G. Washington Coffee & Burnett Division, American Home Foods, Inc., Morris Plains, N. J.

A day-by-day package-fill check failed to give appreciable control, so a Datamatic Weight Calculator was installed on the line to provide positive and irrefutable records of fills.

Made by Scale Specialties, Roseland, N. J., this unit has a sensitive scale and a recording chart. The graph paper moves when a sample is placed on the scale, and the pen records over- or under-weight of that package. The average of each four weights is automatically computed and recorded as a dot on the graph in different colored ink.

In addition, a timing device actuates a pen that contacts the graph on one edge at definite time intervals. This will reveal if too few samples are taken in any specified interval.

The time-cycle portion of the equipment is known only to the quality-control department, and it is used as a check on the application of instructions by the personnel. The graph is continuously visible to the operator as the operation moves along. Trends and shifts, as well as individual deviations, can be noted and corrected.

Using coffee of carefully controlled physical characteristics, the variation within normal filling operations was investigated with the Datamatic. From this information, a norm for product bulk density and particle-size distribution, for each size and type of container, was established. And limits to be maintained insofar as the filling operation is concerned were set up.

The equipment used is a 4-head Stokes & Smith volumetric machine using vacuum and auger to fill the container and the filler head. A pin auger in the filler head revolves during the filling cycle to prevent caking and bridging. The fill is roughly adjusted by the depth of the filler nozzle within the jar, and the fine adjustment is made by manipulating the vacuum imposed in the jar and filler head.

By increasing the vacuum, the powder is filled with a tight pack, while using a low vacuum gives a loose pack. The vacuum is maintained the same on all four heads with one pump, and is controlled by one valve.

A 1% sampling has been found acceptable, at a statistically significant level with 3% and 5% sampling.

Control procedures were published within the plant, and the inspecting personnel instructed in the operation. All daily reports and data go to the quality control department for analysis and interpretation. The inspector samples at the predetermined rate, and any adjustments to the filling machines are guided by the visual graphic record of the weights. Trends, individual filling head peculiarities, and sudden departures from the norm are readily apparent to the inspector and are corrected immediately.

With this new quality control system, overpack was dropped to less than one-third of the previous average, and variations were tightened to half of the former range.

As an aid to close control, batches of the powder are mixed to achieve minimum variation in the physical characteristics of the coffee over long periods of time. In event mixing is not possible, the packaging foreman is alerted to look for, and quickly correct, deviations in fill.

Mueller Makes SQC Pay Off

How closer fill of macaroni products has been achieved with SQC was discussed by V. C. Bremer, Quality Control Manager, C. F. Mueller Co., Jersey City, N. J.

Control techniques differ for long and short goods. But in both cases control limits are based upon individual package weights, not sub-group averages. This procedure was adopted to conform with practices followed by some regulatory agencies. Secondly, averages, when plotted, tend to conceal over and under "outages."

In long-goods packaging, a case is taken from each line every hour by a control staff member. The weights are tabulated at the line, and packages beyond control limits are returned directly to the line supervisor. The daily "outages" are tabulated on a separate report, summarized and averaged at the end of the month. This summary then goes to the production manager.

Production rate on this manual filling line has been upped from 72 to 118 packages per minute, with one more person, by having the six girls put the weighed material into pocket conveyors which transfer the macaroni mechanically into the packages. Previously the girls weighed directly into cartons.

An hourly sampling rate is adequate for this operation, because weighing patterns change slowly.

Closer control is applied to short-goods packaging, done with 6-head fillers at 84-96 per min. Here, product

variability and feed-flow variations affect accuracy of weights. So each scale operator takes five consecutive samples from each pocket. After these are tabulated, the next pocket is sampled in like manner. And after the six heads have been sampled, the operation is repeated. This means that each pocket and the entire scale are sampled 4 to 6 times per hour.

Since there are 120-180 tabulations an hour, calculation and plotting of averages and/or range would require considerable work. Instead, operators study the daily report and make adjustments when the total of each sub-group exceeds a certain value or falls below a certain line. A check mark shows that corrective action has been taken.

If a given scale pocket requires adjustment more than twice in one hour, the maintenance mechanic is called over to determine whether a mechanical or feed-flow repair is needed.

When occasional "wild shots" show up in a subgroup, the defective packages are removed and no adjustment is made. But repetition of these "wild shots" calls for remedial action.

As a check on the scale operator, a staff member takes a sample case for each line, twice each shift. And in addition to the daily reports, a personal check of all packaging lines is made weekly. A case is sampled and the results tabulated on a special form. Then a frequency-distribution histogram is made and a report submitted to top management.

The "spot-check" system has proved the most economical method for Mueller. Complete visual inspection is too costly, inefficient, and time consuming. Automatic check-weighers, to date, will only segregate "out of limit" packages. Scale adjustments still have to be made by an operator, who must also correct defective packages rejected by the check-weigher. Automatic check-weighers which would adjust each pocket of a multi-head filler could well be the answer.

Muller's quality control program as applied to packaging is responsible to the production manager. Its main function is to provide information and advice to packaging supervisors. The control staff has no authority over individual packers or scale operators. Its findings are reported to the line supervisor, who is directly responsible for the correct functioning of the packers or the scales. This avoids conflicting channels of authority and insures participation of the line supervision in the quality program.

There is, nevertheless, a close working relationship among the control staff, scale operators, maintenance men, and line supervisors. Very often this pays substantial dividends, because the people associated with the machines become quite adept in locating causes of weight variations.

Benefits of SQC to Mueller are: (1) The filler is used more efficiently while maintaining reasonable tolerances. (2) Improvement in manual operations is even more noticeable, because discipline and decision are based on fact, not opinion or conjecture.

Borden Likes X-Ray Detector

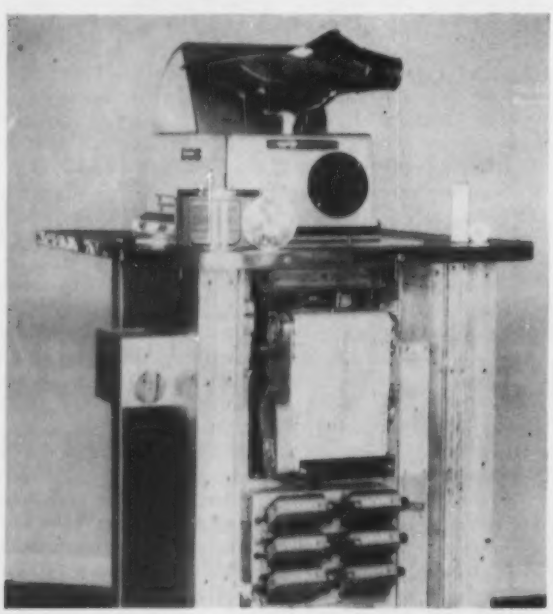
Performance and advantages of the latest in fill-control methods—X-ray level detection—were pinpointed by Eugene L. Hall, Engineering Department, The Borden Co., New York. In a seasonal operation with high labor turnover, such as the evaporated milk business, a method of control which involves every container is more quickly understood and is preferable to spot-checking methods, Mr. Hall said.

Even with line speeds up to 540 cans per min., Borden attains 100% inspection. All underweight containers are rejected, and those overweight are counted.

Detection speeds of the X-ray unit are guaranteed up to 900 per min. This is 8 to 9 times greater than the fastest

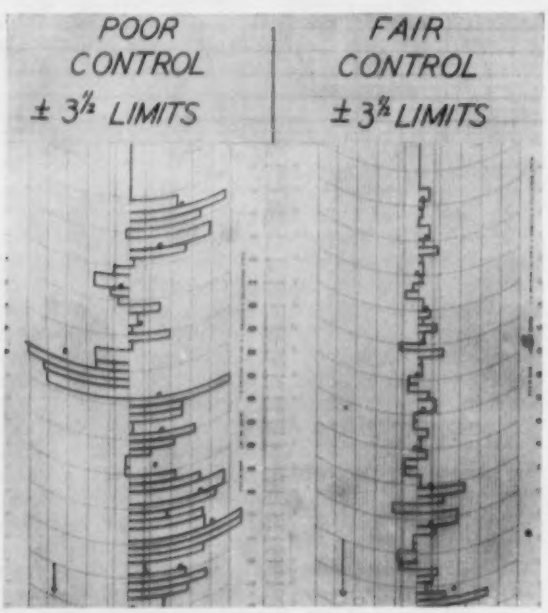
(*Turn to page 206*)

Makes Fill Control Easy . . .



WEIGHT CALCULATOR of type used by G. Washington to chart variations of package weights from norm. It automatically figures test-lot averages. Totalizing counters permit determination of production averages in minutes.

. . . By Charting Data on Samples



SAMPLE CHARTS drawn by Datamatic weight calculator. Humps in graphs show package weight variation from norm, plus and minus. Dots indicate averages of test lots. Drifts from norm are clearly revealed for quick correction by filler adjustment.

Super-Frozen Foods Shipped Overseas *Minus Refrigeration*

Trick is to freeze them down to −150 F. in a special insulated carrying container, using liquid nitrogen as the chiller . . . Technique eliminates danger of product-thaw

FE STAFF

Big commercial potentials are foreseen for a radical new super-freeze way of shipping foods—feasible to any distance or to any climate.

To demonstrate it, a full-scale run has just been made from Chicago to equatorial Venezuela. Carried in this test shipment were frozen vegetables, fruits, and juices. And comprehensive evaluations now proceed.

These three prime details of the shipment illustrate the technique:

1. The foods were super-frozen to the extremely low temperature of −150 F. by using liquid nitrogen (−320 F.) as a direct-contact refrigerant.

2. Thawing of foods enroute was avoided by the protective combination of very low temperature of product guarded by efficient insulation of the special "shipper".

3. And the long-distant shipment was accomplished without use enroute of any of the conventional facilities of refrigeration, mechanical or otherwise, as commonly employed in trucks, RR cars, and cargo areas aboard ship.

The new shipping method, called "Super Chill," was devised by W. L. Morrison, pioneer in the development of home freezers. It employs a 7x7x7½-ft. portable container (6,000-lb. capacity) comprising an aluminum liner and outer jacket with 6 in. of insulation. This unit was built for the test by Aluminum Co. of America.

Down to Details

At point of test origin (Chicago warehouse of Continental Freezers of Illinois, Inc.), 305 cases of Libby, McNeill & Libby frozen foods were loaded into the container. Specifically the shipment comprised 100 cases of frozen vegetables, 130 of fruit juices, and 75 of fruits.

The low-temperature freeze was carried out with liquid nitrogen from a tank truck (Linde Air Products Co.). First flowing through a 1½-in. dia. hose, the nitrogen was then "branched" through three ½-in. copper tubings that fed into the insulated case.

Top of the container was kept loose to vent the nitrogen gas. Nitrogen flow was continued from the 100,000-cu.-ft. truck source for 4 hr. at a pressure of 4 psi.

Here, advantages will be directly noted: For one thing, the system does not require men to handle goods in cold, uncomfortable work areas. For another, no special refrigerating facilities, or maintenance for them, are necessary on the transport carriers. Thus, too, there is a savings in transport space.

INTO this portable, insulated, aluminum container goes flow of liquid nitrogen to super-cool vegetables, fruits, and juices to —150 deg. F. for two-week trip to equatorial Venezuela. Here, Tjae Reiner (left), Chicago Stockyards Research Div. engineer, and W. C. Mitchell, Libby v.-p., examine thermocouple that is keeping tab on drop of temperature within case.

Cost of freezing by this method is seen running about ½¢ per food pound, according to a Linde representative.

After sealing, the container of super-frozen foods was loaded into an unrefrigerated boxcar for a 4-day rail journey to New York. There, it was toted onto the deck of a ship for a 7-to-10-day non-refrigerated trip to the consignee, Pesqueias-Carabie, a Venezuelan supermarket chain operated by N. D. Dao.

Libby, McNeill & Libby guaranteed that the super-frozen products would be received at below-zero temperature.

According to W. C. Mitchell, Libby v.-p. in charge of frozen foods, this development promises to open up a broad new overseas market for his firm. And he added that prospects of using the method for domestic frozen food shipments were even more encouraging.

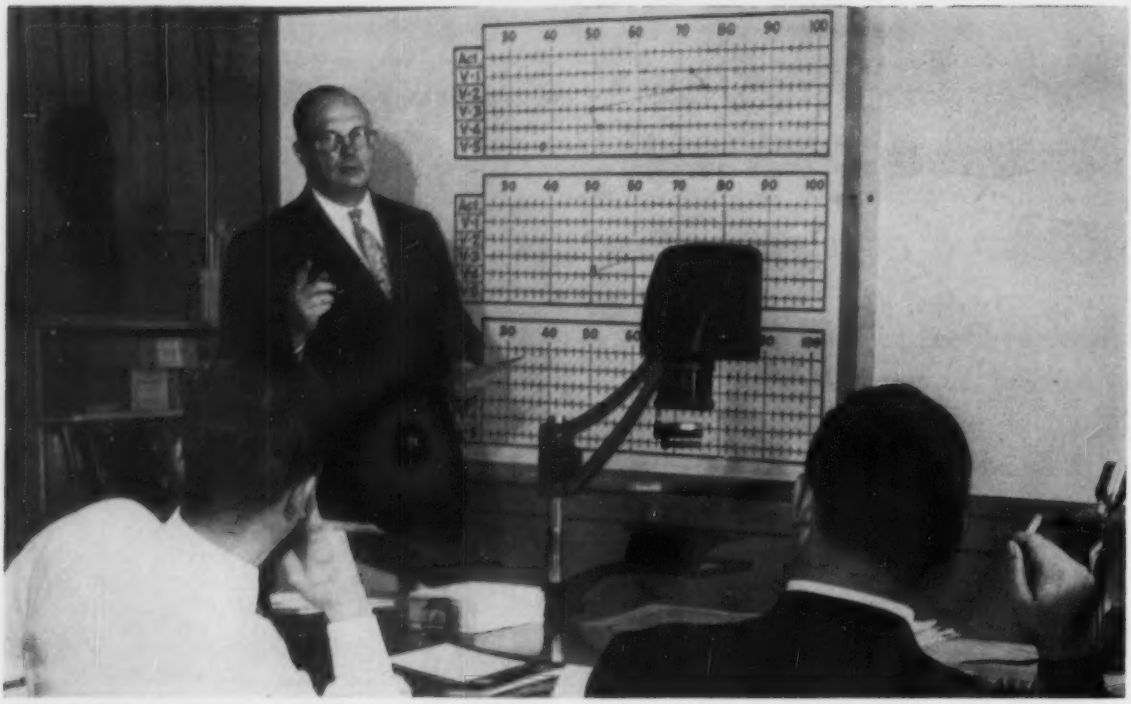
Further, the method might be adapted by the Armed Forces for bringing tasty heat-and-serve frozen food dinners to GI's up in the front lines.

Prior Checks

Belief in the efficacy of the new method has been founded in earlier pertinent trials.

In one instance, a nitrogen-treated container holding 10 tons of frozen food was set directly in the path of a constant flow of 90-deg.-F. air. Here, checks made after 6-7 weeks did show some warming—but only of certain portions of the food contents, and then just to 0 deg. F.

In another interesting small-scale test, 200 lb. of frozen steaks made a non-refrigerated boat journey to Helsinki, Finland, and continued from there by train to Moscow. This meat arrived in top-quality frozen condition and was served to a party of visiting American athletes.



CONCENTRATED STUDY prepares these men for applying and grading the fast new personality test. Here, Walter V. Clarke, developer of method, leads group discussion of individual patterns during final phase of two-week training session.

Simple New Test Assures

Selection of *Good* Supervisors

Modern hiring methods put the right men in the right spots. On-the-job training—conference style—boosts efficiency

E. S. BOHLIN and ROBERT J. KELSEY

Respectively, Personnel Manager, The Welch Grape Juice Company, Inc., Westfield, N. Y., and Assistant Editor, "Food Engineering"

To keep abreast of a near quadrupling in product demand over the past nine years, The Welch Grape Juice Company, Inc., Westfield, N. Y., has had to greatly expand its supervisory staff.

Accordingly, this processor has sought—and now found—better ways to (1) select, and (2) train these new management people for handling the upped output.

What AVA Does

Meeting of the first objective—dependable selection—has involved use of a striking test called the Activity Vector Analysis.

Specifically, this technique answers the salient question, "Is this the right man for the job?"

Here, a "see-ahead" approach is used. Rather than gaging a man's intelligence, mechanical aptitude, and training, this new management tool serves to forecast how the applicant will employ these capabilities on the job, and how his temperament fits.

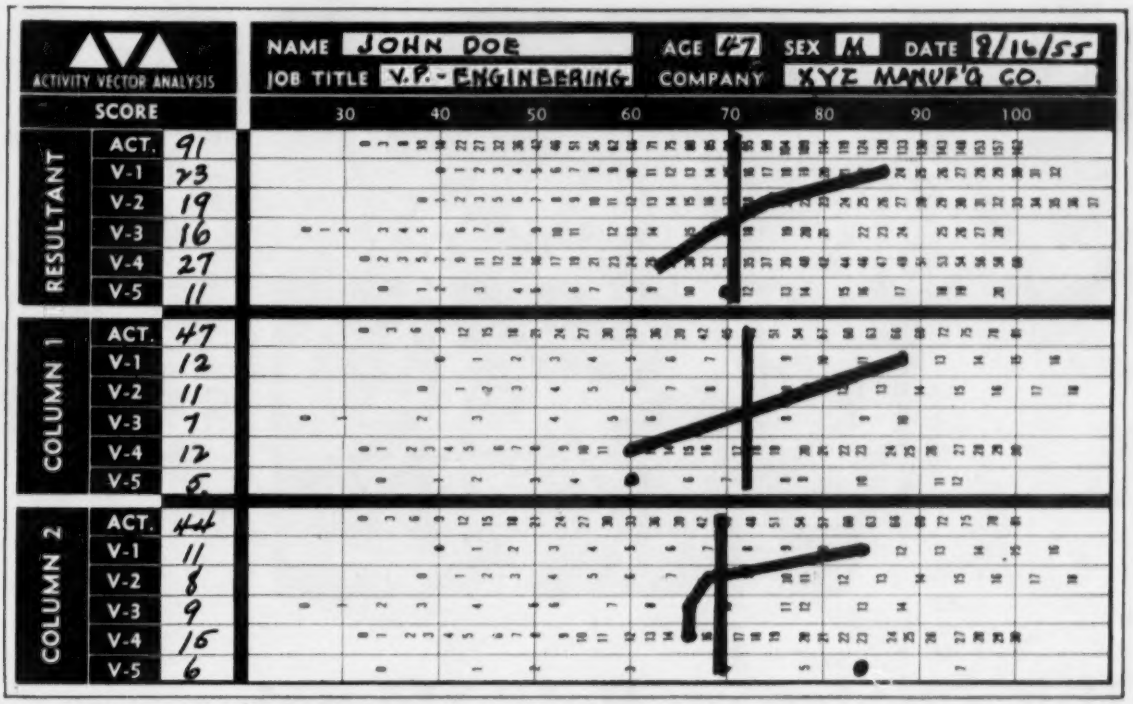
It further indicates how much effort he will devote to his work and how he will get along with the people around him. Moreover, it reflects his potential for growth—very important in long-range supervisory planning.

Seemingly, all this would require extended, tedious study. But here the answers are obtained within 15 min.—the mere time needed to conduct and then grade the examination!

Says Executive V.-P. Ray Ryan: "AVA thus fills an important gap in personnel relations. It gives management a much closer look at applicants, and it also helps guide employees along careers good for both them and the company."

Particularly noted is a striking correlation between test forecasts and subsequent performances of the workers. Also, the answers to some individual problems of present workers have been discovered through voluntary employee participation in the AVA program. Management has thus been able to help these men to new job security.

First essential in this program is a trained analyst to apply tests and interpret results. Finding him is simplified by the fact that he need not be a trained psychologist. However, he



CLOSEUP VIEW of a personality "profile", from which a trained analyst reads results in minutes. Here, John Doe's test results have been translated (right) into specific graph markings (the heavy curves and dots). Top section—resultant of individual personality factors—charts Doe's probable behavior on the job in question.

must have a positive personality and high intelligence.

He gets two weeks of intensive training from Walter V. Clarke Associates, Providence, R. I., developer of the testing method. During this period he absorbs the technique of application and scoring proficiency. An allied training session "fills in" top management on the pertinent policy and organization of the system.

At Welch, the analyst position is held by the director of personnel. Meanwhile, the executive v.-p. and production manager have taken the policy course. These men say that one prime result gained is a standard vocabulary by which employee qualifications can be discussed in quantitative as well as qualitative terms—with a minimum of explanation.

Further, the company has learned it can compare the traits of applicants with those of present employees. Finding of similarities gives a known basis on which to judge mental attitude, temperament, and behavior with respect to a specific job.

Test in Action

AVA really is deceptively simple. In fact, the simplicity of it all is the key to the test's success, since it puts the applicant at his ease. Employed are just 81 descriptive words—such as "persuasive", "cautious", "bold", "forceful", and the like.

There are no right or wrong results. And evasive answers are easily detected, usually showing up by forming an exaggerated picture of the individual's normal self.

When taking the test, the prospect first checks every word that he can remember people having used to describe him. He then goes through the list a second time and marks words which he feels best describe him.

The analyst sums up the results by overlaying the test paper with five different stencils. He then plots the data on a special graph that gives a "profile" picture of the man's probable behavior (see illustration).

This result comprises three factors:

1. The "mask" that people want to show the world.

2. The "basic" man which most people tend to conceal.

3. The resultant of the first two factors: The man as he actually appears to other people.

The gaining of this picture postulates: (A) That the personal pattern is a relatively unchanging thing; (B) that human activity can be described by the factors of aggressiveness, sociability, emotional stability, and adaptability; and (C) that these four factors have direction and magnitude, thus can be plotted as vectors.

While the integrated, or total personality pattern, is the most important test result, individual factors can be studied by examination of the separate vectors.

It is always emphasized that the test should never be administered to present employees other than on a *voluntary* basis. At Welch, all supervisory and office men have been cooperative in taking the test, to supply the pertinent information by which new employees will be selected.

Future plans call for extending the system to include all permanent employees—an approach which has found general acceptance by union officers. They feel it can greatly reduce personal bias in selection and promotion.

Before this step is taken, AVA job-analysis patterns will be computed for all catagories. From these it is theoretically possible to match the applicant's pattern with the job pattern. If they fit, there is no further problem.

In practice, however, company personnel men do not depend on this test alone.

Several other tests are used that are designed to measure technical skills such as: Arithmetic and verbal abilities, clerical and stenographic proficiency, and mechanical comprehension.

Also, the personal interview is still

(*Turn to page 214*)

INSTANT READING of percent soluble solids of preserves in evaporator is achieved with refractometer in vessel's steam jacket. Note how operator flicks lever that actuates windshield wiper to clear optical surface of stagnant liquid, then glances into instrument's eyepiece. Refractometer is clamped by three thumbscrews to adapter that is welded to openings cut through steam jacket. Top of former sampling tube is visible in right foreground.

This In-Stream Refractometer Unsnags Soluble-Solids Control

Also gages turbid or high-color liquids . . . Eliminates time and expense of conventional sampling . . . Readily handled by average operator

LEONARD TRAUBERMAN
Assistant Editor, "Food Engineering"

Take a precision refractometer and adapt it into a process vessel, pipeline, or evaporator steam jacket—and you literally have in-stream control of soluble solids.

And if you further arrange an optical system that permits gaging of turbid or highly colored liquids, you also overcome a great disadvantage of older-type bench or hand refractometers.

In actual fact, these actions are combined in an instrument recently introduced (Goldberg Instruments Ltd., West Simsbury, Conn.). It comes from Israel, where it is extensively used in citrus processing.

Operation is simple. All that is required is to look into an eyepiece clamped to the process vessel and read off the Brix corrected for temperature. A manually operated windshield wiper sweeps stagnant layers of material away from the optical surface to insure a representative sample.

Hence the widespread interest among American processors of preserves, fruit juices, tomato products, chocolate syrup, and certain milk products in the new-control method that—

1. Can be handled by unskilled operators to free laboratory personnel for other duties.

2. Eliminates the delay, inaccuracy, and expense of sampling a material in process.

3. Provides an accuracy of ¼% (some dark liquids ½%) that enables holding costly product giveaway to a minimum.

We will detail actual and proposed applications. But first let us take a closer look at this special refractometer:

About the Instrument

Basically, a refractometer measures the slowing down of light from its normal speed in air to its rate in passing through the denser medium being gaged. With dark-colored liquids, however, absorption of some of the rays causes a haze that obscures the shadow line.

In contrast, this refractometer operates on reflected light. Position of the sharp transition line from light to dark (as seen on the graduated scale in the eyepiece) depends on how obliquely the light coming from the instrument is reflected back into the instrument by the liquid. And this angle of reflection is determined by the liquid's refractive index.

As a result, even highly colored materials—blackberry juice, chocolate syrup, or blackstrap molasses—may easily be checked.

Available in two Brix ranges—12 to 72% and 0 to 25% soluble solids—unit is resistant to temperature shock and, if equipped with high-temperature gasket, may be used up to 230 F. Maximum recommended for the standard model is 150 F. Since product does not contact the optical system, refractometer is sanitary, while all metallic parts are of stainless steel (303).

Instrument is mounted in a process vessel by cutting an opening and welding a flange (3⅞ in. i.d., 6½ in. o.d.) to it. Then, three thumbscrews clamp the instrument to the flange. With this arrangement, unit may be removed in 30 sec. and replaced by a dummy cover plate. Maker recommends removal when pan is boiled with caustic, since hot alkali attacks the optical surface in time.

A 6v. flashlight bulb provides light inside the instrument, power being supplied by a small door-bell transformer. This eliminates need for armored cable and simplifies removal of the unit.

Refractometer is calibrated to read in degrees Brix directly at any given temperature by means of an adjusting screw, which is easily turned from the outside by a screwdriver. In systems where temperature variation greater than 5 F. is expected, a thermometer graduated in degrees Brix is used with the instrument. Operator adds or subtracts thermometer reading to or from that of the refractometer.

But for single-temperature operation, such as the endpoint of an evaporation, errors may be eliminated by disregarding absolute values. Endpoint is set at an arbitrary number that corresponds to desired Brix, and the setting need not be changed.

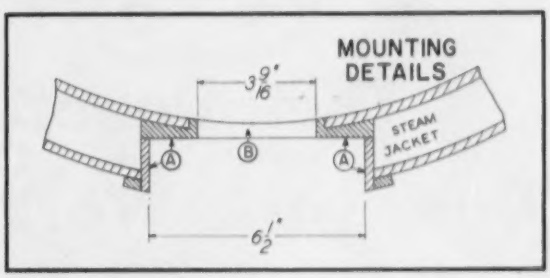
Accompanying table lists instrument accuracy with a variety of food products. Although this refractometer is not recommended for high-fat liquids, presence of sugar in sweetened condensed milk overcomes the haze to permit a measurement accuracy of ½%.

For pure sucrose solutions, Brix is equivalent to percent sugar. However, for other solids in solution—as in tomato paste and concentrated skim milk (see graph)—Brix readings by refractometer differ somewhat from actual total solids.

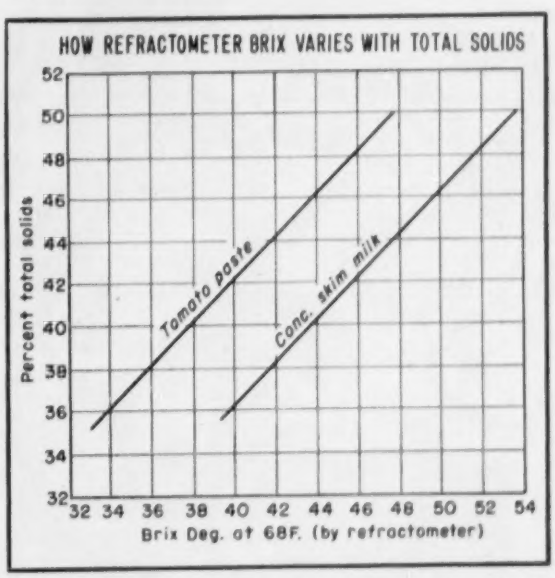
Its Accuracy With Various Foods

Item	Instrument Range (deg. Brix)	Accuracy (%)
Juices:		
Concentrated orange	12–72	1/16 ±1/16
Concentrated lemon	12–72	1/4 ±1/8
Concentrated apple	12–72	1/4 ±1/8
Concentrated grape	12–72	1/4 ±1/8
Single-strength juices	0–25	0.1 ±0.05
Strawberry jam	32–82	1/16 ±1/16
Grape preserves	12–72	1/4 ±1/8
Apple sauce	0–25	1/8 ±0.05
Tomato juice	0–25	*1/4
Tomato paste (below 15%)	0–25	1/4 ±1/8
Tomato paste (above 15%)*	12–72	1/2 ±1/4
Catsup	12–72	1/4
Beef extract	0–25	0.1
and "stock"	12–72	1/4 ±1/8
Condensed skim milk	12–72	1/16 ±1/16
Sweetened condensed milk	12–72	1/2 ±1/4
Lactose	12–72	1/4 ±1/8
Lactose	0–25	0.1
Condensed whey	12–72	1/2 ±1/4
Chocolate malt syrup	12–72	1/4 ±1/8
Chocolate syrup	12–72	1/2 ±1/4
Maple syrup	12–72	1/4 ±1/8
Molasses	12–72	1/4 ±1/8
Black strap	12–72	1/4

* Proper sampling critical



HOW ADAPTER RING (A-A) is fitted into aperture cut in steam-jacket wall (horizontal section). Instrument is incorporated in disk-form mounting that fits at (B).



HANDY IN OPERATIONS is this kind of graph, quickly converting Brix readings by refractometer to percent total solids for materials containing solids other than sucrose.

Unique Applications

How this instrument simplifies Brix control is seen at the Philadelphia plant of Theresa Friedman & Sons, which processes some 15,000 lb. of preserves daily.

Formerly, preserves were cooked here in two 150-gal.-capacity evaporators. But gaging the proper endpoint (65 to 68 deg. Brix, depending on the product) was a time-consuming job that required 5 to 7 samples per batch. These were drawn from the pan at various stages in the evaporation, and Brix was measured with a hand refractometer. Final reading was made in the laboratory, occasioning further delay.

Drawing multiple samples from vacuum pans was troublesome when fruit particles clogged the sampling mechanism. Then, too, hand refractometers had to be cleaned and dried after each reading. But the greatest drawback was need for constant supervision by a skilled technician to prevent overcooking the batch.

When increased production required installation of a third vacuum pan, this progressive company turned to in-stream refractometry. Here, there was an element of uncertainty, in that this was the first American installation of the instrument through an evaporator steam jacket. But following factory-installation in a 150-gal. evaporator (Mojonnier) according to manufacturer's specifications, it has been operating successfully for eight months.

Subsequently, two additional instruments were put in the older evaporators by welding special adapters to openings cut directly through the steam jackets. As shown in the drawing, outer opening is of 6½ in. dia., while that at the inner wall is of 3⅞-in. dia. As in conventional mounting, instrument is clamped to the adapter by three thumbscrews. Downtime was only 4-5 hr. per pan.

With all evaporators instrumented, the pan operator now monitors the boil to the correct endpoint by occasional instantaneous checks, which leave him time for other duties. No other control is required, except for spotchecks on the finished product several days after production. This is necessary because sugar diffuses out of the fruit into surrounding liquid until equilibrium is reached. With unit's accuracy of ¼%, (Turn to page 216)

BOTTLING OPERATIONS feature advanced units in "U"-shape layout that saves floor space and cuts conveying.

Their Roboted Filling Line *Downs* the Work, *Ups* the Output

Designed especially for pint-size throw-away bottles, beverage maker's new "U"-shaped setup stars latest units that "mechanize all the old manuals"

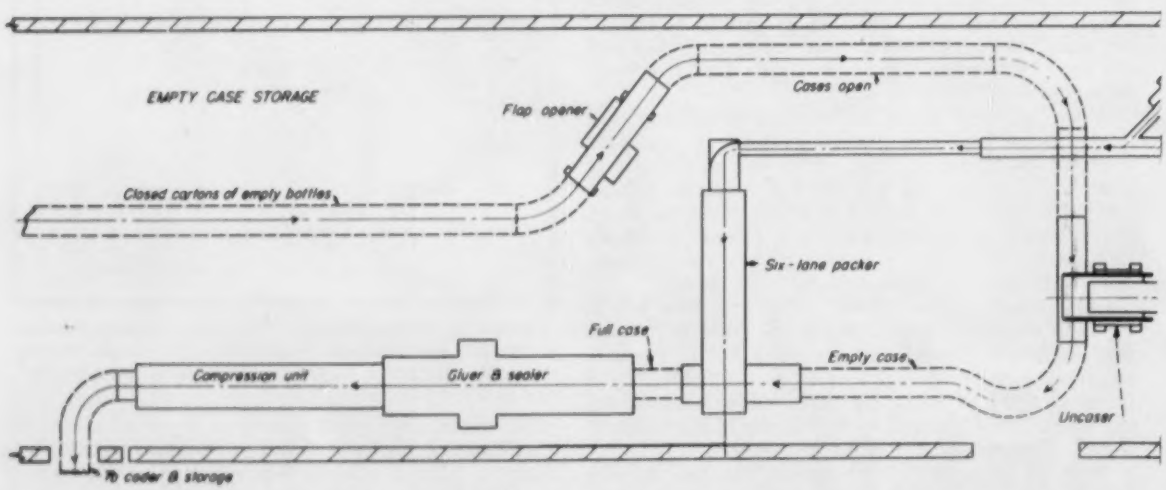
ARTHUR V. GEMMILL
Senior Associate Editor, "Food Engineering"

A striking degree of automation has been attained by Kirsch's Beverages, Brooklyn, in its new No-Cal bottling line—credit going to use of the latest labor-saving units, with the accent on careful engineering.

Result is production of 225 bottles (16-oz.) per min with five operators.

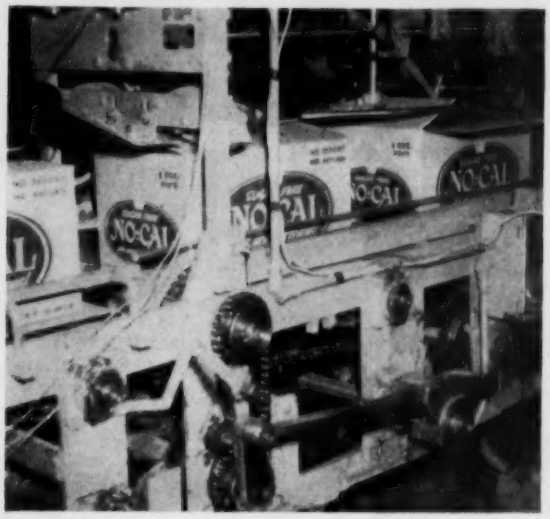
The line was designed specifically to handle the non-returnable bottles used exclusively for the company's popular sugar-free carbonated beverage. These are received in paperboard cartons and, following fillings, are shipped in the same containers.

To conserve floor space the line was set up in a "U" with approximately parallel conveyor lines bringing

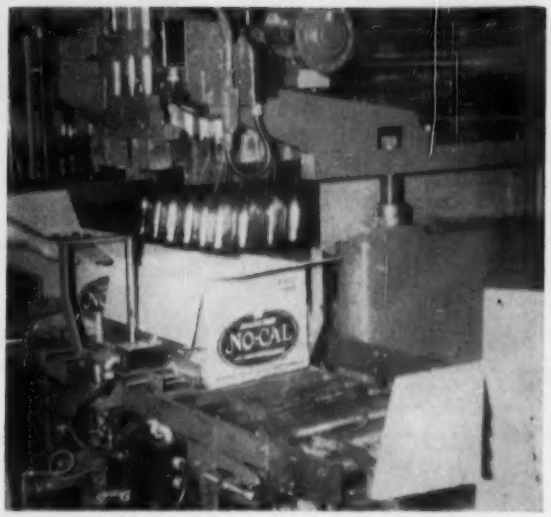


SCALE DRAWING (⅛ in. = 1 ft.) of No-Cal bottling line shows how cases of empties are fed from storage (left), filled

Turn Page



1 **CARTONS** are automatically opened by specially designed unit comprising plows that turn back outer flaps, fingers that open inner ones.



2 **EMPTY BOTTLES** are lifted from carton by steel fingers that grip their necks, then move them to converger that forms single line on conveyor.

cartons of empty bottles from storage and removing containers of filled ones to the warehouse (see drawing below).

Another advantage of the "U" shape is the close proximity of case unloader and loader, which minimizes distance the empty cartons must be conveyed before filling.

Operation of the Line

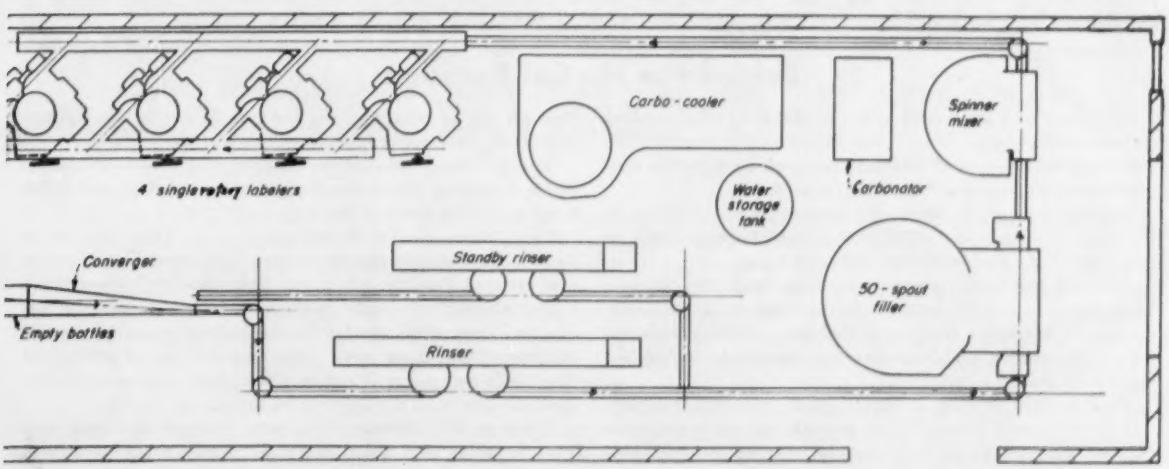
First step in the actual filling operation is removal of empty bottles from cartons in which they are received. This is done with a Standard-Knapp case unloader and converger, a highly specialized machine in which steel fingers move down over the necks of individual bottles and lift the entire case load (24 bottles) as a unit. Bottles are then set on conveyors that converge in a single line feeding the rinser.

At the rinser (an S-K unit) an infeed worm removes the bottles from the conveyor and inserts them in individual pockets. They are then inverted, flushed with water, allowed to drain, and replaced in an upright position. Clean bottles are transferred from pockets to discharge conveyor.

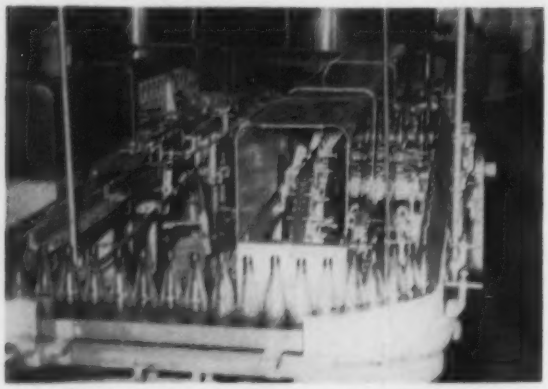
Next comes filling. Used is a 50-spout Cem (Crown Cork & Seal) filler complete with syruper and crowner. This unit operates at an average speed of 225 bottles per min. Bottles then move to the spinner mixer and on to the labelers.

The bottle carries attractive body and neck labels and has foil around the top. To apply these at the present line speed, four single rotary labelers (S-K), each with a capacity of 70 bpm., are used. In these units a star-wheel removes bottles from conveyor line and times them into the feed turret, which in turn places them on a rotary table. Here, they are gripped by upright fingers that hold the bottles firmly as labels are applied.

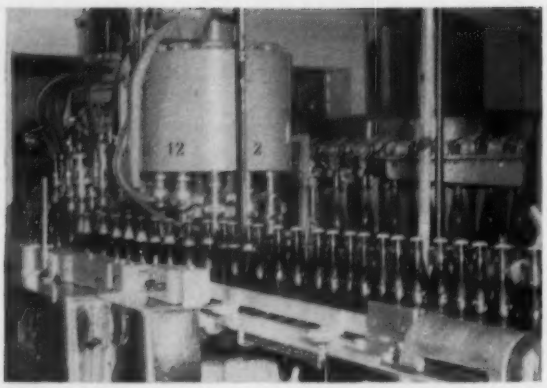
Foiling of the necks is done by soft rubber rolls that follow along with the bottle and, at the same time, roll the



ones leave at same end. Dual-carbonation of filling water is provided by Mojonnier Carbo-Cooler, Kol-Flo carbonator.

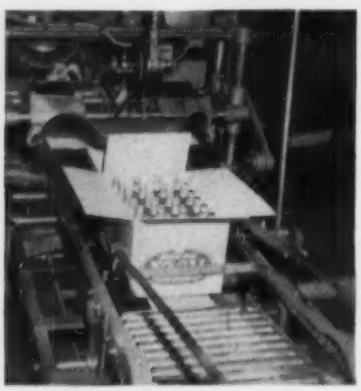


3 **RINSER** removes empties from conveyor line, inverts and flushes them with water, returns them to line.



4 **FILLER** has 50 spouts, adds syrup and carbonated water to bottles, crowns them at speed of 225 per min.

5 **CASER** groups 24 bottles (6 rows of 4), lifts carton, drops them in.



6 **GLUER-SEALER** puts glue on outer flaps, folds inner ones.

7 **CODER** stamps flavor and code number on all sides of cartons.

foil tightly around neck of the bottle.

Three more units (all S-K's) now come into play:

Labeled bottles are conveyed to the automatic 6-lane packer that assembles them in lots of 24, then lowers them into raised cartons. Filled cartons are closed and sealed in a gluer and sealer, then conveyed to an automatic case printer that applies the flavor and code number on both ends and both sides, thus making it easy to determine regardless of their position in the warehouse.

Cases are then conveyed to storage or directly to trucks for delivery.

One of the toughest problems that had to be licked in the new line was the opening of cardboard cartons containing the empty bottles. Tops of these are not sealed, but lack of rigidity causes some of the cartons to be misshapen. However, opening is now done automatically by means of a specially designed flap opener.

This machine times each carton into carrier bars that position it and control its movement. Outer two flaps are lifted by vacuum cups, then mechanical plows turn them back. Mechanical fingers then open the inner flaps. In this position, the carton moves to the uncaser.

Behind the No-Cal Package

A pioneer and front-rank seller in the field of sugar-free carbonated beverages, No-Cal was introduced in March 1952 following many years of intensive research by Kirsch's vice-president and chemist, Dr. S. S. Epstein.

During this period, particular consideration was given to the type of container—whether it should be returnable or non-returnable, and what size it should be.

The nod was finally given to the one-way bottle, because long experience with returnables in marketing its sugar-sweetened beverages had impressed the company with the fact that grocers and supermarket operators found the come-back bottle a nuisance.

Furthermore, studies indicated that, cost-wise, the one-way bottle would favorably fit in with use of a relatively inexpensive corrugated case—one bearing advertising value by carrying the No-Cal trademark on all sides.

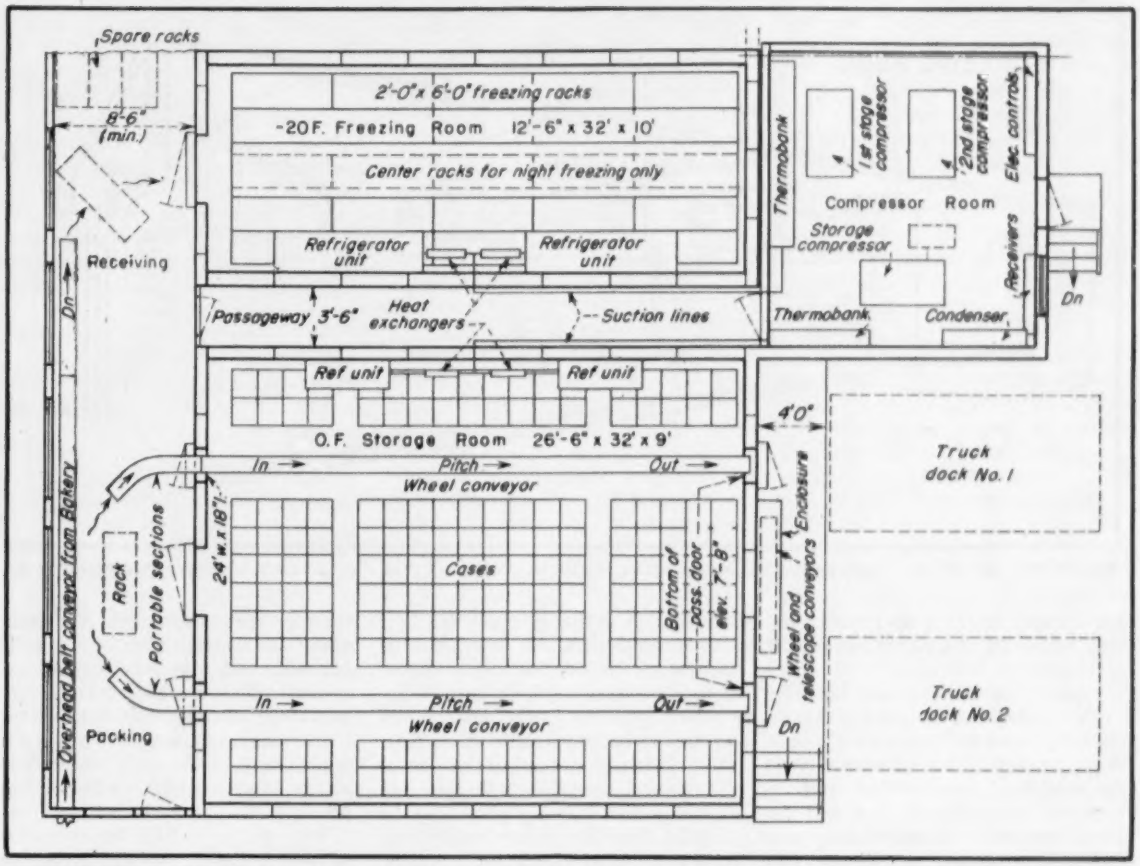
As for container size, the pint was given a special eye. Though not in common use for soft drinks it was figured drinks thus carried would appeal to the home trade.

The 16-ouncer ultimately adopted was a non-returnable bottle featuring distinctive body and neck labels and a foil band around the top of the neck.

First flavor marketed was ginger ale. Then six others were added—black cherry, cream, cola, root beer, lemon, and orange. Further, a salt-free club soda is also produced.

Zooming sales brought production problems, too. In '52, the two lines used at the Flushing Ave. plant for sugar-sweetened beverages were supplemented by an additional line built around a 50-spout filler. And a 40-spout filler line was put in at the Bartlett St. plant.

Then in '53, another 50-spouter was installed and, step by step since that time, other automatic units have been added to form the highly economical line described in the accompanying article—*The Editors*



SUGGESTED FLOOR PLAN for bakery freezing plant. Products are conveyed directly from wrapping machines, transferred to racks for freezing. Receiving room also serves for packing loaves into cartons, which are conveyed to storage.

How to Design and Equip

That Bread Freezing Plant

Unit should comprise separate receiving, freezing, storage rooms, and be adjacent to bakery so hot products can be conveyed directly from wrapping. Blower-type evaporators, Freon compressors recommended for refrigeration

LEONARD F. PATRIDGE
Consulting Engineer, Tuckahoe, N. Y.

Freezing of bread has a distinct advantage where the product must be shipped to remote points—for in this way the consumer is assured of a loaf as fresh tasting as locally baked breads.

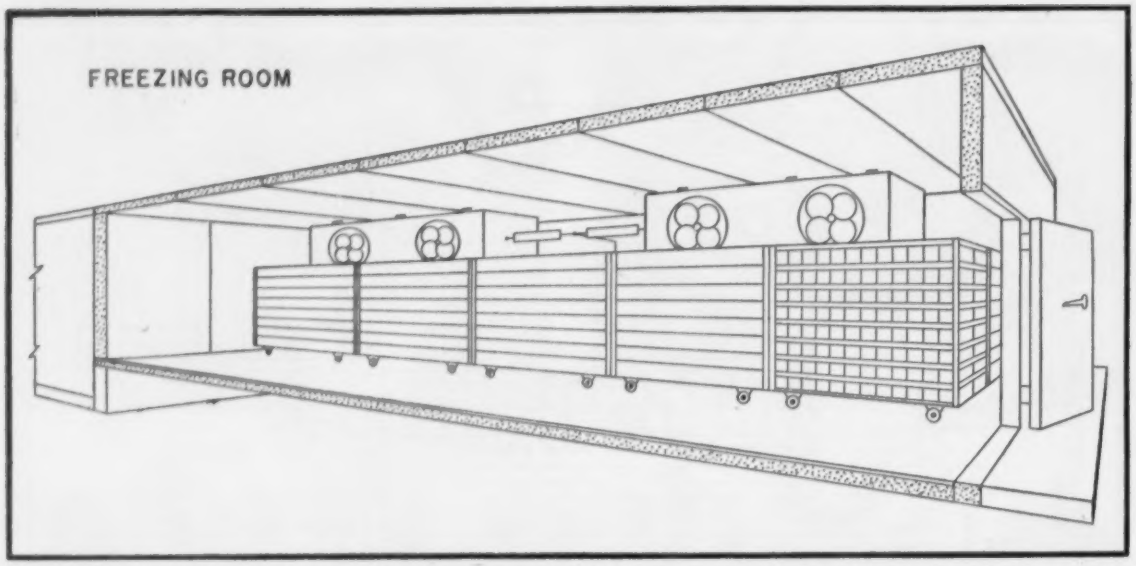
Once frozen the bread can be stored until ready for distribution, and large shipments can be made, thus reducing transportation costs.

Additional benefits of freezing are: ▶1. **Reduction in number of production days or overtime, as the case may be. In many bakeries, this saving in labor costs is sufficient to pay for such a plant in a reasonable period of time.** ▶2. **More uniform scheduling, with excess production going into the freezer, and with shortages made up from the frozen stock.**

Further augmenting the main freezing plant with small cold storage boxes at strategic distribution points will make it even more certain that the product reaches the consumer in its most acceptable condition, while almost entirely eliminating stale returns.

In the case of pies, economies can be effected by making them on a uniform daily schedule, followed by freezing. As needed, they can be removed, baked, and delivered fresh to the consumer. This abolishes making up each variety daily at an additional production cost and more readily allows meeting variable retail requirements.

A few plants have used commercial cold storage warehouses for the freezing of bakery products. In these cases, cost of freezing is in the vicinity of 1¢



FREEZING ROOM has ceiling-mounted evaporators equipped with fans that circulate air around products on racks.

per lb. and handling and transportation ½¢ per lb., giving an overall cost of 1½¢ per lb.

Expense of freezing and handling in one's own well-designed plant, on the other hand will not exceed .4¢ per lb. of product. This includes interest on investment, amortization, and operational costs. Payoff time will depend somewhat on accounting procedure, but should not exceed two years in cases where commercial freezing is used as a comparison.

General Considerations

Construction of a freezer plant by Arnold Bakers Inc., Port Chester, N. Y., in 1954, marked the first major development in the freezing of bread and other bakery products on a large commercial scale. Experience and information obtained here led to erection of several similar facilities during the early months of 1955.

Technique of freezing will vary somewhat, according to product handled. Here, use of open racks has been found both simple and economical. Layout of the plant will depend on its location, freezing volume required, future requirements, and distribution methods.

Time for product to reach the freezer plant from the wrapping machine should be great enough to permit cooling to room temperature, but not to the staling range (70-20 deg. F.).

The ideal plant would be located adjacent, or in close proximity, to the wrapping room so that the wrapped bread could be conveyed directly to the receiving room.

Many factors should be taken into consideration before attempting construction of a freezer plant. First, it should be determined whether it is to be used for long distance distribution or for local or short hauls.

Next question is the quantity of product to be frozen daily on an 8-hr. shift. This will determine the size of the freezing room. It involves the rate at which the freezing plant can be supplied from the bakery without upsetting a normal production schedule.

It is then necessary to determine the rate and frequency of product shipment, in order to establish the size of the storage room. For long distance distribution it is not practical to use refrigerated trucks to transport racks of frozen bread. Capacity of trucks is too limited, and transportation costs too high. More advantageous is shipping in cartons, with provision of cold storage and thawing facilities at the terminal.

It is unlikely that long distance shipments will be made daily, therefore, the storage room must be large enough to hold at least two days' supply.

For local distribution, there is considerable benefit in storing the bread on racks. The storage room may have to be larger. But with some daily shipments its size should be held down considerably. Also, there should be a room in which the bread may be thawed on racks before it is delivered locally. This room ought be held at 80-85 F. with moderate velocity air circulation. A period of 4-5 hr. would appear to be reasonable for thawing under these conditions.

It is necessary to determine the size and capacity of the racks, since these factors have a direct bearing on the dimensions of the freezing room. Racks can be constructed of aluminum or galvanized steel. Aluminum ones are lighter, thus more easily handled, and also require less heat removal. However, they have the disadvantage of high thermal conductivity, which involves rapid change of temperature, if the racks require long storage time at a higher ambient temperature.

The plant should be comprised of the following rooms: Receiving; −20 F. freezer, 0 F. storage; and packing. In some cases transfer of frozen bread from racks to cartons can be carried out in the receiving room, thus eliminating need for the packing room (see accompanying floor plan).

Receiving Room

As previously stated, it is pertinent to locate the freezing plant so that the bread can be conveyed directly from the wrapping machine to the receiving room. It is well to keep this room at a temperature of 75-80 deg F., and provide space for the loaded racks to be stored until the product reaches this temperature.

The average freezing plant can be handled with two men—one to load the racks, and one to transport them to the freezing room. A signaling system should be provided between the wrapping and receiving rooms so that the freezing plant operators can start the belt conveyor and have racks ready for loading.

Freezing Room

There should be careful design of the freezing room to allow proper air circulation and provide for efficient handling of the racks. It is desirable to

obtain an average face velocity of 1,000 fpm. at the evaporator, and an average air circulation of 500 fpm. for rapid freezing.

Sufficient height is required so that the outlets of the evaporators are not unduly obstructed (see accompanying drawing). A room that is too small will prevent proper air circulation and make it more difficult to stabilize temperatures. And an excessively large room will increase the initial plant cost out of proportion to any advantage gained.

The prefabricated box affords values of lower costs and flexibility, and it maintains a relatively tight enclosure without excessive heat loss or moisture infiltration. Care must be taken, however, to design the panels properly, with the required sleeves for pipes, etc., so that it is not necessary to penetrate the walls after the panels have been factory sealed.

Cork, Fiberglas, plastic foam, and other materials, are available for wall construction. Thermal conductivity of these does not vary greatly and all are suitable. It is advisable, however, to use a good vapor barrier with many of these materials.

A room 12 ft. 6 in. wide, 32 ft. long, and 10 ft. high will accommodate 20 freezing racks (2x6 ft.) with a capacity of 450 loaves each or a total of 9,000 lb. It will provide an average freezing rate of 1,125 lb. per hr. on an 8-hr.-shift basis. By placing an additional row of five racks in the center of the room at the end of the day shift, it will be possible to freeze at the rate 18,000 lb. per 24 hr. without overtime.

Freezing time will be approximately 4-hr., and racks should be removed and replaced uniformly over an 8-hr. period or at an average of 5 racks per hr. The room will require approximately 11 tons of refrigeration for this rate of freezing. Temperature of freezing room should be approximately —20 F. in order to cool the product below the staling range (70-20 deg.) as rapidly as possible. However, it is not practical or necessary to hold this low temperature continuously. To do so would involve additional refrigeration capacity and excessive installation cost (see accompanying charts).

It is important that the product be wrapped tightly to prevent excessive dehydration during the freezing period. And the refrigeration system must be designed for the proper temperature differential in order to hold this dehydration to the minimum even with a tight wrapper.

Packing & Storage Room

Wherever it is necessary to place bread in cartons, a packing room is required. It can be combined with the receiving room in many cases. But certain precautions should be taken.

Temperature of freezing room is —20 F., and that of the storage room 0 F. This allows a maximum rise of 20 deg. during the packing period. But it is preferable to hold this rise to 10 deg.

A package air conditioning unit for warm weather, and a unit heater or heating coil for winter operation, will provide comfort for packing and maintain adequate temperatures and ventilation.

Principal consideration in design of the storage room should be given to efficient material handling. The product, after being sealed in cartons, should be stored at approximately 0 F. until it is ready for shipment. To assure air circulation, cartons should be placed on a grid.

Storage space should be at least twice the volume of the freezing room and, in many cases, even greater. Conveyors should be provided to move the product in and out quickly and with little manual handling.

A dock for loading the refrigerated transports should be provided at one end of the storage room, with proper pass doors for use of gravity conveyors. These conveyors can be kept permanently in place, except for the short portable sections at the pass doors. In this way, the trucks can be readily loaded by gravity feed from any point.

Charts Aid Calculation of Refrigeration Requirements

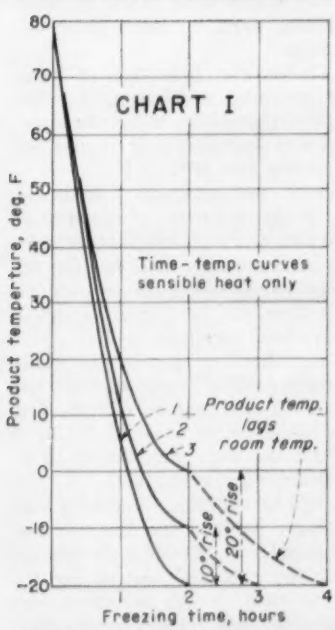


CHART I: Effect of temperature on freezing time. Curve No. 1: Held at —20 F.; Curve No. 2: Rose to —10 F. during loading; Curve No. 3: Rose to 0 F.

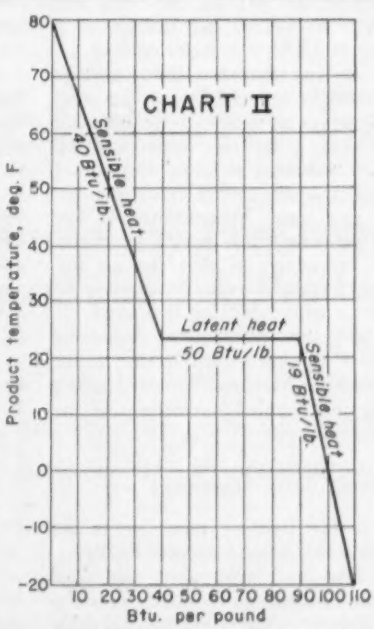


CHART II: Heat removed during freezing of bread. Average specific heats are approximate. Latent heat is based on bread with 35% moisture at 23 F.

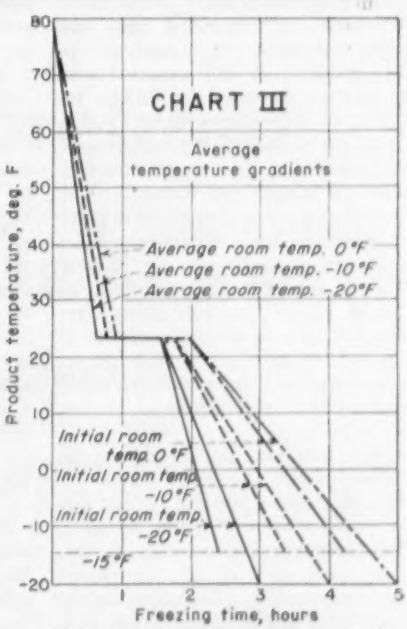


CHART III: Temperature gradients used to determine compressor capacity. They are valuable in obtaining final freezing time, establishing loading cycle.

Trucks should be precooled to 0 F. and loaded as quickly as possible. The packaged product will stabilize the temperature in the truck after loading so that there will be little danger of thawing.

Refrigeration Equipment

Having dealt with the general design and operation of the freezing plant, we will now consider the mechanical equipment required to produce the refrigeration.

As that needed for the storage room is rather simple it will be discussed first. Calculations are based on a room 32 ft. long by 26 ft. wide (see plant drawing). Total heat load is approximately 30,000 btu. per hr. or 2½ tons. This includes heat loss through walls, infiltration due to periodical opening of large door and pass doors, and miscellaneous losses because of lights, motors, etc.

Two evaporators will give adequate capacity and ample air circulation. These are selected for a temperature differential of 10-15 deg. F. A room temperature of 0 F. and an evaporator temperature of −15 F. will be found satisfactory. This will require a 7½ hp. compressor, which allows adequate reserve capacity for cycling.

It may be considered that there are no peak load conditions, inasmuch as the product is frozen before storage. But some variations will be encountered because of prolonged opening of pass doors during loading periods. This is taken into consideration in determining the capacity of the units. Evaporators are mounted near the ceiling and above the product, so the air movement is not retarded and the product is cooled by the air returning to the evaporators.

Hot gas defrosting has been found satisfactory for this type operation. Relatively simple and economical, it should not present difficulties if properly installed. Since this plant will be in operation 24 hr per day, a long off cycle need not be considered. In case of a prolonged shut-down, care must be taken to defrost manually, if required, upon start-up. And proper precautions are in order to avoid overloading of the compressor during this period.

Compressor should be selected for operation with Freon-12. This gas will operate at a pressure on the suction side, which is highly desirable, and discharge pressure will not become excessive with any method of condenser cooling. Compressor should be operated at low piston speeds (250 fpm. for example) in order to insure long life and low maintenance. A higher speed unit may save a few dollars in initial cost, but in the long run it will be found to be more expensive due to shorter life and higher maintenance costs.

In this particular case, an air cooled condenser can be used to advantage. This eliminates the necessity of water piping and cleaning of the condenser, also it avoids corrosion and freezing problems that may be encountered in some localities during winter shutdowns. It also obviates need of a cooling tower or evaporative condenser.

An air cooled condenser poses problems, too, particularly with respect to the higher condenser temperatures. Let us assume that we have cooling water at 75 F. during the summer, and the condenser operates at 130 psia. discharge pressure or 99.1 F. This unit will use 4 gpm. of water for cooling or about 1.6 gpm. per ton of refrigeration. With a 50% cycle, it will require 11,600 cu. ft. of water per month. At a cost of 16¢ per 100 cu. ft., this will amount to $18.50.

With an air cooled condenser, it will be necessary to operate at 110 F. temperature or 150.7 psia. Not being excessive, this pressure should give no difficulty. The compression ratio will increase and a larger motor will be required—in this case, an additional investment of approximately $45. If necessary, the compressor speed could be increased slightly without materially decreasing its life.

Increase in horsepower will be approximately 1.27, and the condenser fans will require 460w. or a total of 1406w. of additional electrical load. On the basis of a 50% cycle and power at 2¢ per kw. hr. this will amount to $10.06 per month, or a saving of $8.44 over water cooling.

It is true that the water cost is substantially reduced by using a cooling tower or an evaporative condenser. But taking everything into consideration, it will often be found economical to use the air cooled condenser for this size unit. Maintenance is low and the installation quite simple. Another advantage is that the air discharged from the condenser can be used for winter heating if desired.

The entire installation should be made with due regard to the provisions of the American Standard Safety Code and detailed instructions of the manufacturers.

Freezing Room Equipment

For the freezing room, units are considerably more involved. Refrigeration load is variable over a period of 24 hr. and sufficient capacity must be available to freeze the product quickly under peak load. A room 32 ft. long by 12 ft.-6 in. wide is well adapted for the use of forced air evaporators.

Assuming that the room is designed to freeze approximately 1,125 lb. of product per hour on a 4-hr. freezing cycle, a total capacity of 18,000 lb. of product can be frozen over a 24-hr. period by proper scheduling of rack movements.

Evaporators should be selected for a normal room temperature of −20 F. and evaporator temperature of −30 F. This differential will provide adequate humidity for the product so there is little danger of excessive dehydration in case the wrapper is not completely sealed.

Evaporators should be located at the ceiling, on the 32 ft. wall and spaced for optimum air circulation. Care should be taken to locate the door properly, so there is no excessive air blast at this point.

A considerable portion of the air will drop over the product before reaching the far wall, and thus there will be good air distribution throughout the room. Total load will be in the vicinity of 132,000 btu. per hr. or 11 tons of refrigeration. Two evaporators will handle this load and maintain high air velocity.

With the temperatures involved, two separate compressors operating on a 2-stage system will be found advantageous, both from an operational and maintenance standpoint. The equipment is easier to handle than a single-stage compressor, and the motors will be better adaptable to a small plant.

For this type plant, the choice of gas is between Freon-12 and Freon-22. Efficiencies of the compressors will not vary widely with either, so other conditions must be taken into consideration.

F-12 has the advantage of lower head pressures, which simplifies the condensing problem. It has the disadvantage of operating at a vacuum on the suction side at −30 F.

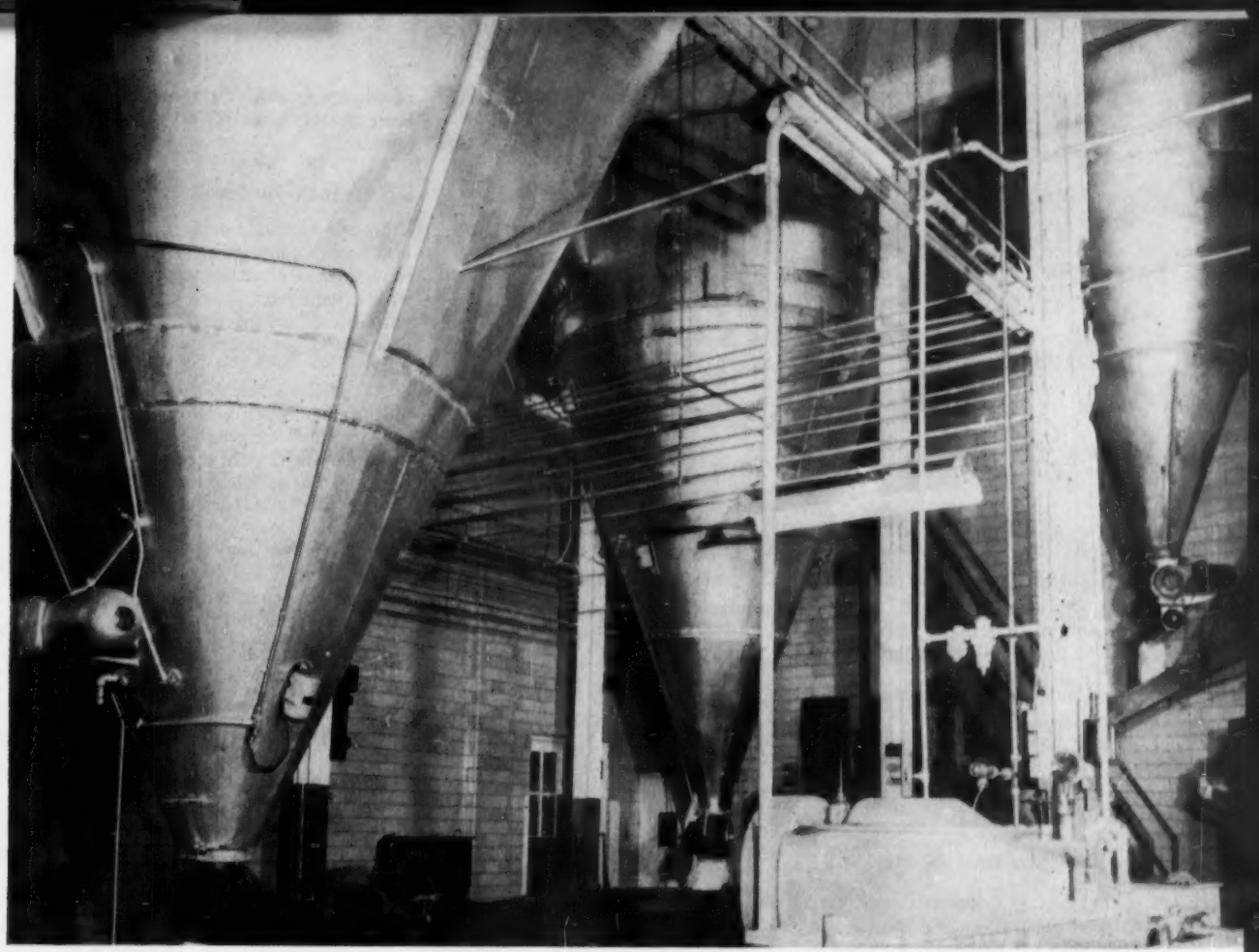
With inexperienced personnel, there is always danger of entrance of moist air into the system when operating on a vacuum. F-22 has the advantage of operating on pressure on the suction side, but the disadvantage of high head pressures.

These disadvantages can be easily overcome with a 2-stage separate system. F-22 can be used for the first stage (from −30 to +30 F.), and F12 for the high stage (from 20 F. to condensing temperature).

It will be necessary to install a heat exchanger between the two systems. Additional cost of this unit may increase the initial investment slightly. But, in turn, it will provide a very economical and simple system to operate.

The first stage will require a 15 hp. compressor for use with F-22, and the

(Turn to page 159)



HIGH PRODUCTION RATES are now being achieved in well engineered spray-drying units such as this. Up to 2,500 lb. of egg solids are dried hourly in cone-shaped unit at left. Primary and secondary collectors (center and right) recover powder from exhaust air. Solids drop and are cooled, sifted, and packed in a continuous, efficient operation.

Egg Solids to Forefront

—Through Advanced ★ Processing, ★ Engineering, ★ Equipment, and ★ Product Performance

Manufacture of better quality, "tailor-made" products, with extended shelf-life, is made possible through new processing methods won by constant, practical research

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

From extensive, careful researches has come the "extra something" that has enabled dryers to bring about the present great improvements in quality and selling potentials of egg solids.

What these studies did was to show how adverse quality changes principally stemmed from high moisture level, oxidation, and "browning" (Maillard reaction between egg glucose and amino groups of egg proteins).

And these findings then opened the door to the past decade's advanced developments in egg drying tech-

FOOD ENGINEERING SPECIAL REPORT

FROM PERSISTENT RESEARCH in well-equipped laboratories come findings that result in consistently higher quality egg solids with extended shelf-life and improved functional properties.

niques, facilities and equipment, and production standards.

Results have been a tremendous lift in palatability, functional performance, and storage stability of the products.

How Technologists Took Hold

Good quality dehydrated eggs were produced during World War II. But the trouble was that such eggs would not hold up well during storage and transportation.

Prominent here was the off-flavor—and to some extent changes in color and solubility—traced to changes in the phospholipid-egg fraction. Specifically, this reaction was between an unknown aldehyde group and the amino group of the lipid, cephalin. In part, this reaction was retarded by acidifying the eggs prior to drying.

Final curbing of this off-flavor was credited to USDA researches that identified this aldehyde as unsuspected glucose. And removal of glucose from eggs prior to drying eliminated most of the off-flavors developed during storage.

Also, further progress was achieved by checking the browning—in short, stopping undesirable changes in solubility and functional properties of the egg solids.

Two pre-drying treatments—(1) acidification, (2) glucose removal—were unquestionably responsible for the outstanding betterment in quality and stability.

First method involves pasteurizing and adding edible acid to the liquid egg, and next spray-drying to about a 2% moisture level. Sufficient baking soda is then adding to the dried eggs to neutralize excess acidity upon reconstituting with water. Cooled, dried eggs are finally inert-gas-packed in hermetically-sealed cans.

In this case, three things—high acidity, low moisture, and inert gases—retard adverse color and flavor changes attributable to glucose-induced reactions. Rancidity in the fats of whole-egg and yolk solids has also been notably checked by this procedure.

Stabilization Fundamental

Second method, stabilizing egg solids through de-sugaring, is either by fermentation or enzymatic action. As with acidification, liquid eggs may be pasteurized before drying, and the dehydrated product may be inert-gas-packed.

As for the fermentation technique, glucose may be removed either by bacteria or yeast. Generally, select strains of bacteria and yeast are employed to destroy the reducing sugars. Large inoculations rapidly ferment out of glucose and, thereby, prevent growth of undesirable organisms likely to create off-odors and flavors. End products of fermentation, ethyl alcohol and CO_2, volatilize during drying, slightly reducing yields.

Newest method of de-sugaring is enzymatic. Here, instead of reducing glucose to alcohol and CO_2, oxygen combines with the egg sugar to convert it to stable gluconic acid.

Other significant quality-improving innovations have included: (1) Development of multi-stage dryers to produce, without scorching, egg solids with a low moisture content; and (2) adoption of a commercial technique for pasteurizing liquid whole eggs to reduce microorganisms.

Noteworthy, too, is another technique—adding sucrose to liquid yolks and whole eggs prior to spray drying. The sugar, in this case, reduces unwanted changes in their physical and functional properties during drying. Such sugar-dried eggs contain 20-30% sucrose.

The sucrose addition permits the dry product to retain its whipping ability—a required functional property when the product is used in cake mixes.

Moreover, methods for producing almost yolk-free albumen have proved significant—especially to manufacturers of prepared angel food cake mixes. For as little as 0.1% yolk in albumen greatly destroys its whipping properties.

More Investigations

Work is now underway on development of techniques for freezing individually broken out, packaged whole eggs. If successful, there may be a notable step forward in marketing egg products.

Customers would be assured of the same quality control measures that go into the production of most frozen and canned foods. Age of eggs would then be of significance only prior to

EGG SOLIDS PRODUCTION, 1927-1954, Broken Down Into Whole Eggs, Albumen, and Yolks (in 1,000 lb.)

Year	Whole	Albumen	Yolk	Total
'27	161	0	395	556
'32	15	492	1,869	2,286
'37	74	541	1,776	2,391
'42	226,127	2,253	7,269	235,649
'43	252,903	2,093	6,976	261,972
'44	311,369	2,310	7,063	320,742
'45	96,988	1,710	7,164	105,862
'46	115,344	2,113	7,988	125,455
'47	80,037	1,493	4,031	85,561
'48	35,343	2,628	5,521	43,492
'49	69,411	2,266	4,285	75,962
'50	86,993	3,605	2,820	93,418
'51	9,553	3,619	3,132	16,304
'52	2,717	6,552	8,069	17,338
'53	5,311	5,820	8,277	19,408
'54	2,925	9,287	10,226	22,438

breaking. There would be less seasonal price variations, and less dependence on nearby eggs.

Consumers would be able to get a product of controlled and uniform quality, free from defects, and sold by the pound.

Drying Techniques

Liquid yolks and whole eggs are spray-dried. Whites, on the other hand, are spray-, pan-, and fluff-dried.

Several types of pan-dryers are commonly used. They vary somewhat in construction and method of processing, but their basic drying principle is the same. Liquid whites are poured in relatively thin layers into aluminum or stainless steel pans, which are then loaded into drying cabinets where relatively low-temperature air passes over them until they are dried.

The dried whites may then be processed into: (1) Large, clear flake or crystal albumen; (2) granular albumen of a dull coarse nature; or (3) powdered albumen—a careful grind of either of the flake or granular types.

Equipment for spray drying may differ considerably. Essentially, however, all units produce a fine powder of good quality and uniformity.

Swift & Co., holds patents on fluff drying. Here, albumen is whipped into a foam that is extruded onto a stainless steel belt traveling through a drying oven. The dried foam is then powdered to uniform mesh size.

Various users require different types of albumen. Confectioners generally use an acid-type albumen of relatively high moisture content. Cake mix makers employ two types—one without whipping properties, for incorporation in egg-type mixes containing shortening, and the other for angel food cake mixes. Albumen for the latter must have certain whipping properties and carefully controlled pH, moisture, reducing sugars, particle size, etc.

Many Varieties

Moreover, egg dryers are now "tailoring" the products for specific food industry uses—for example:

1. Whole eggs for cake mixes, cookies, and pies.
2. Powdered albumen for angel food cake mixes, other cake mixes, meringues, and confections.
3. Yolk for noodles and cake or doughnut mixes.
4. Flake albumen for confections.
5. Glucose-free egg yolk solids with 10% added sucrose to improve functional properties and extend shelf-life.
6. Dextrose-free whole egg solids—also to extend shelf-life and improve functional properties.

Mileposts in the Rise of Egg Solids

Egg drying got its U. S. start in the early '90's. But our initial product could not compete with dried albumen from China.

Even before the 19th Century, Orientals had been allowing egg white to undergo natural fermentation, brought about by whatever microorganisms "worked on" the eggs. Fermented whites were then dried on pans, or in trays or drums.

It was in the late 1920's that the picture was brightened for our producers by levy of a 27c. tax against each imported pound. Yet this didn't entirely resolve the question of competition.

Real turning point was outbreak of civil war in China, curtailing its shipments. Then domestic producers began making sizable quantities of albumen and other egg solids.

In the early days, practically all albumen was pan-dried and most went to confectioners or formulators of meringue powder.

During World War II, the Army bought large quantities of whole egg solids for consumption by the armed forces. And later it purchased them as a support measure for egg producers.

Large-scale production of dried eggs continued on through 1950. Purchases of them had continued to be a means for the Government to discharge price-support responsibilities.

Wartime egg solids had frequently lost quality in storage and shipping, thus a certain stigma became attached to the term "dried eggs." This remained one of the major problems when, some three years ago, domestic dryers formed the Egg Solids Council to improve and promote use of egg solids. This group's decision—reflected in its name—was to substitute the term "egg solids."

"Operation Quality"

It was the broad armed-forces use of dehydrated eggs that led on to notable advances in the production of high quality egg solids. These came about from a direct attack on basic problems—as detailed in this Special Report.

Today, the U. S. leads the world in supplying egg solids. In 1954, a total of 22,438,000 lb. were produced—an appreciable increase over 1953's 19,408,000 lb.

And there even may be a variety of specially prepared egg solids. Whole egg solids, for instance, may be dehydrated without treatment (called standard), stabilized, fortified (as with additional yolk), sugared, stabilized and fortified, stabilized and sugared, or fortified and sugared.

As an added-ingredient for bakers and mayonnaise makers, frozen eggs may contain sugar. Also, salt may be put into frozen yolks used to make noodles.

Biggest users of egg solids, of course, are makers of prepared cake and doughnut mixes. Notable has been the increased use of albumen in the preparation of angel food cake mix.

This has been mainly brought about by improving the functional performance of whites to increase baked cake volume. And functional performance has been attained by processing egg white solids with considerably less of the undesirable high-fat-containing yolks.

Appearing on retail-store shelves are still newer convenience foods in which egg solids play a chief role. Recently marketed, for instance, is Pillsbury's Fluffy White Frosting Mix. Package contains two envelopes, one for egg white solids, the other for the sugar-flavoring mixture. In addition to a package choice of ten variations of the basic white frosting, there are recipes for prune whip, divinity candy, marguerites, and meringue shells.

New Uses In the Home

Solids makers predict that skilled homemakers will come to use handy envelopes of egg white solids for their own recipes.

Baked Alaska, meringue topping for pies, and macaroons are just a few desserts that might be added to the list.

Pillsbury also recently introduced other new mixes, like peanut cookie, fudge brownie, and orange cake. There is also Py-O-My's brownie mix, packed in a disposable aluminum-foil baking pan. And Duff's new no-shortening low-calorie mixes—chocolate and golden cake—are packed along with a frosting mix.

Meanwhile, bakers became less skeptical. Some are employing easy-to-use prepared cake mixes put up in bulk containers. Some, even have gone 100% to egg solids, for preparing cakes.

Prepared mixes, shipped in institutional packs, have enabled bakers to save production time by reducing scaling operations. And uniform quality of the cakes is noted.

Egg solids people point to added

crumb strength and resilience in cakes, increased tenderness and fine silken texture of angel food cakes, with formulas, and color consistency.

Of course, convenience is primary. Users simply scale amounts required out of drums. For long shelf-life (over a year), drums should preferably be stored under 40 deg. F.

Some noodle makers, too, have switched to egg solids—proportioned, along with semolina and metered water, into the macaroni presses for a convenient, no-fuss operation.

Further, tests under way by several mayonnaise and salad dressing firms point to the likelihood here of a greater future use for egg solids.

FE SPECIAL REPORT

CANDLING OPERATION reveals defective eggs. Sound units are loaded into pails that whisk by conveyor to breaking

Engineered Methods Make Better Egg Solids

In unitized operations, latest blending, homogenizing, stabilizing, pasteurizing, and dehydrating techniques implement quality control and sanitation to yield highest-grade product

Advanced equipment and techniques now support sanitation and quality control in modern egg-solids production.

In general, processing is a 9-step operation involving egg collecting, candling, breaking-separating, blending, homogenizing, stabilizing, pasteurizing, drying, and packaging—all conducted under rigidly-controlled conditions.

Taken Fresh from the Farms

Eggs are collected on farms 2-3 times a day, then held in cooling rooms (50-60 F.). They reach buying stations three ways: Pickup by stations mechanically refrigerated trucks (50-60 F), delivery by farmers not on buying stations' truck route, and collection of farm-delivered eggs at grocery stores.

At stations, eggs are candled for processing and then trucked in 500-600 case loads to drying plants or egg breaking stations. Trucks are refriger-

ated for long hauls. Breakers are either owned by egg dryers or operated under contract.

Broken-out eggs are laboratory-checked in breaking plants for solids content, total bacteria, coliform organisms, yolk color, and amount of yolk in whites.

Liquid eggs then proceed to drying plants. Henningsen, Inc., for example, receives 30,000-lb. lots of 33-34-Deg. F. liquid eggs in insulated stainless steel trucks. These trucks are so well insulated that they travel up to 800 miles, with egg temperatures rising only 1-2 deg. F.

Tank truck loads—whites, yolks, or whole eggs—are pumped into huge churns or blenders equipped with agitators. Here, viscous and non-homogeneous eggs are gently agitated (without whipping) to produce a smooth, finished product.

Plants that receive shell eggs, have candling and breaking-separating operations. These are conducted, in most instances, on conveyorized lines.

So strict are sanitation standards in egg-breaking plants that all utensils—pails, tables, benches, trays, knives, and cups—are of stainless steel to withstand daily live-steam sterilization. What's more, cups, trays, and knives are sterilized every several hours.

Fast Breaking Lines

Highly efficient candling and breaking lines are in operation at Tranin Egg Products Co., Kansas City.

Here, an endless overhead conveyor chain continuously carries 360 buckets from candling to breaking floors. Several lines, of 30 candlers each, subject each egg to light rays to make certain that they contain no blood, meat spots, or other defects. At the same time, the girls place dirty eggs into separate buckets that move to a washing machine prior to going to breaking room.

Buckets, each holding 6 dozen cleaned, candled eggs, move directly to breaking room on the floor below, where they travel along three lines of 112 girls.

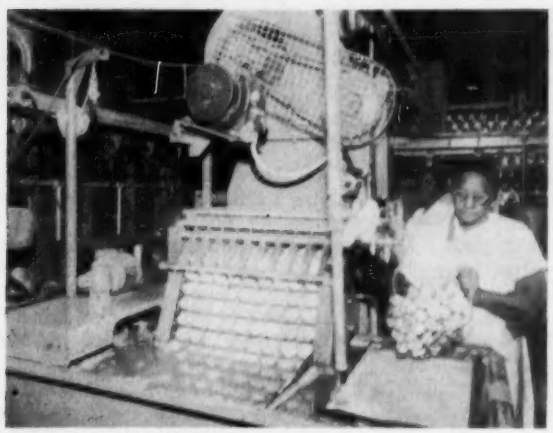
Each girl breaks, separates, and examines about 16 cases (30 dozen to a case) per 8-hr. day. Employed by each girl are a horizontal, permanently-mounted breaking knife and cup-and-ring device for separating whites from yolks. In production on whole eggs, of course, there is just the breaking.

Liquid eggs are collected in stainless steel pails that are loaded onto the same overhead chain conveyor. It delivers them to a highly skilled inspector, who smells each tagged pail and rejects off-odor batches before eggs are dumped into the churns.

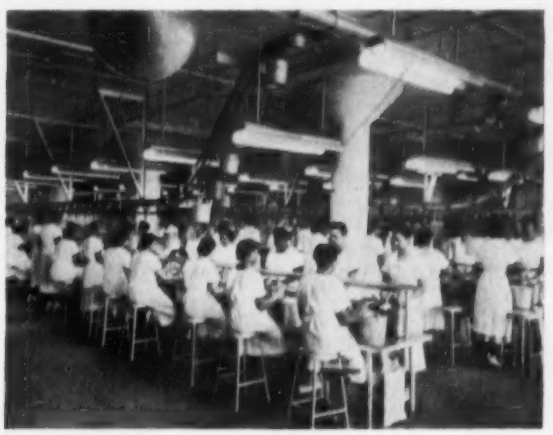
Meanwhile, shells are conveyed into a basement byproducts department. Here, laundry-type centrifuges recover small amounts of whites adhering to the shells. These saved whites are packed in 30-lb. tins and frozen as byproducts.

At the churning station, yolks or whole eggs are agitated in four, 300-lb. capacity, stainless steel churns. Whites go into two holding tanks, and are then screened before being pumped into 2,300-lb. capacity plastic-coated transport trucks. These are hauled to the adjacent drying plant by hand trucks.

Churned yolks and liquid whole



THOROUGH CLEANING is given all dirty eggs in this washing and chlorinating machine. Blower (center) dries them before they go to breaking operation.



BREAKING-ROOM GIRLS separate yolks from whites, using cup-and-ring devices. Chain conveys whole and liquid eggs to and from line.

SKILLED INSPECTOR double-checks each pail of liquid eggs. Any with off-odor is rejected.

GENTLE BLENDING in this series of churns prepares liquid eggs for de-sugaring and drying processes.

eggs go through a homogenizer and screens. Later remove any shell particles or membranes before eggs are loaded into transport trucks.

In the churn, sugar or salt is added to yolks that are to be frozen in 30-lb. tins. Also, there is an addition of sugar to yolks or whole eggs destined for dehydration. And extra yolks may be put into whole eggs.

Empty galvanized egg pails continue along Tranin's chain conveyor back to the candling room on the floor above. Pails are washed and sterilized before they return to the breaking room girls.

Candling and breaking, too, is a straight-through operation at the Springfield, Mo. plant of Henningsen, Inc. Cases of cooled eggs (50-60 F.) are loaded onto tables, where eggs are placed on transfer belts for flash-candling.

Those which contain defects are rejected. "Dirties" are loaded into baskets and transferred to a 15-doz. capacity egg washer. Here, they are water-soaked, washed in detergent solution, chlorine-rinsed, and fan-dried before proceeding by conveyor to the adjacent, breaking room.

From candling, belts carry clean eggs under a 5,000-ppm.-chlorine spray to the breaking room. Long lines of girls break, separate, and smell the eggs. Girls take any questionable eggs to an inspector, carrying them in stainless steel cups (holding 3 eggs each), along with the breaking trays. If rejected, girls' cups, trays, and hands are sanitized in chlorine solution.

Yolks, whites, and whole eggs for freezing are scaled directly from churns to 30-lb. tins, which are conveyed to blast freezers. Other pre-processing operations follow the Trainin procedure.

To detail succeeding steps, let's follow processing of yolk and whole egg solids:

Stabilizing, Drying

At Henningsen, yolks or whole eggs from breaking line or tank trucks are pumped directly from churns into an agitator-type holding tank.

However, frozen eggs, received in 30-lb. tins, are first defrosted. Warm water and fans thaw material so it can slide out of tins and into an ice crusher. Crushed eggs are discharged into a jacketed, agitator-type pre-warming tank, where they are heated to about 35 F., then pumped through a plate-type-heater, where they are flash heated to 85 F. in 15 sec.

Critical point of the process—stabilization to extend shelf-life—comes when eggs go into the vats. There, egg glucose is inactivated in 2-3 hrs. with the help of deoxygenase-catalase. Hydrogen peroxide is pump-proportioned into the mix and is broken down by the catalase to free oxygen and water. Deoxygenase helps unite oxygen with glucose to form gluconic acid.

Stabilized eggs are then cooled to 40 F. in a jacketed, stainless steel tank, equipped with agitator, to curb possible baterial growth during holding. They are flash-pasteurized (143 F. for 3½ sec.). Then they are pumped under high pressure (2,000-8,000 psi.) through eight nozzles into a spray dryer (at 1,000 to 5,000 lb./hr.).

Filtered hot air (250-350 F.) drys atomized eggs in seconds. Primary and secondary collectors catch egg powder that would otherwise escape through the exhaust. Bulk of the powder (under 5% moisture) drops to the bottom of the dryer and is conveyor-cooled below 100 F. while moving to a screen sifter. Powder from collectors is added here.

Yolk and whole egg solids are then packed into polyethylene-lined drums or bags that are sealed, labeled, and shipped.

A Second Drying System

At Tranin's liquid yolks or whole eggs are pumped from transport trucks to 6,000-lb. holding vats equipped with refrigerated, coil-type agitators. These hold the eggs at 40 F. Eggs may be stabilized at this point.

They are transferred to 500-lb. capacity holding tanks, and then pumped under high pressure into conical shaped spray dryers at a 900-lb.-per-hr. rate. Here, too, primary and secondary collectors catch powder likely to be lost through dryer exhaust.

At the bottom of the spray dryer, a starwheel discharges egg solids into portable trays holding about 1,000 lb. Powder from collectors is added, and trays are rolled to a forced air cooler that lowers egg temperature to about 80 F. Sifted solids are finally packed in 200-lb. polyethylene-lined drums.

Processing Egg Whites

Now let us briefly detail highly advanced processing steps at three typical egg white-drying plants:

At Emulsol Corp., Chicago, fresh whites from nearby egg breakers are pumped through stainless steel lines into 8,000-gal. capacity stainless fermenting tanks equipped with agitating-type heat-exchangers (Tranter Platecoils). De-sugaring of whites, (60-75 F.) in these tanks is achieved by fermentation (over 30 hr.).

Fermented whites are next clarified through a bowl-type centrifuge at a 6,000-lb.-per-hr. rate. From 3,000-gal., stainless holding vats, stabilized whites are pumped through a flexible line and loaded into drying trays by hand-operated trigger-type discharge nozzles. A tray holds about 8 lb. of whites, and each of the five dryers contains a total of 1,260 trays.

Drying air first passes through a battery of self-cleaning filtering screens, then continues over gas-fired burners (equipped with automatic safety shut-off valves). Heated to 118-121 F., air is blown over the trays. Drying from a 87% to 5% moisture content takes about 44 hr.

Albumen is dumped from trays into five stainless steel bins, holding from 900-1,200 lb, and then filled into 300-lb. polyethylene-lined steel drums.

Granulated albumen is sized through ¼-in. screens, then is packed into 225-lb. poly-lined fiber drums. Albumen to be sold in powdered form is passed through a pulverizer. Ground at a 100 to 300-lb.-per-hr. rate (depending upon size of screen in micropulverizer), drum lots of albumen are discharged into a 3,500-lb. mixer-type blender with the aid of a hoist. Blended albumen travels to a hopper, from which it is raised by bucket elevator to a sifter. Packing into drums follows.

Two-System Plant

At Henningsen, Springfield, Mo., whites are both pan and spray-dried. Whites are received in tank-truck lots or frozen 30-lb. tins. Tank loads are pumped through plate-type coolers if necessary, to lower temperature to 40 F. Both defrosted and tank shipments of whites are then pumped to insulated storage tanks.

Temperature of whites is raised to 80-90 F. when they are pumped through a plate-type heat-exchanger and into stainless steel vats (15,000-20,000 lb. capacity). Here, whites are de-sugared by a controlled fermentation process or enzyme treatment.

From this point, whites may be pan or spray-dried. We will follow the pan-drying operation:

Stabilized whites are pumped into aluminum pans holding 25-30 lb. Pans are row-stacked in the primary dryer. Drying to 20-25% moisture is accomplished in 12-20 hr. Transfer is then made to a secondary unit. At this point, whites are loaded into mesh-bottom trays, stacked 10 to a tier. Drying with 120-F. circulating air takes 3-5 hr, then trays are removed and manually shaken. Albumen drops through mesh into an oscillating stainless chain belt.

Product conveys to a hopper, from which it travels over screens that separate it into four sizes. These fall through to separate hoppers mounted

over an inspection belt. Oversize albumen, not passing through screens, is returned to the secondary dryer for re-drying. Product is packed, after inspection, as granular and flake types. Powdered albumen is prepared as at Emulsol.

Now to the spray-drying system: From processing tanks, stabilized whites are pumped through a plate-type cooler that reduces temperature to 45 F. Pyrex pipes next deliver product to two holding tanks. A high-pressure pump (2,000-3,000 psi.) feeds them into a rectangular-shaped Rogers spray dryer.

Whites are atomized through 16 nozzles. Incoming air is filtered as it enters the controlled heating unit, and it is distributed from a large duct to four headers surrounding the spray nozzles. Dried whites that drop to the bottom are fed by a drag chain into a horizontal screw conveyor, then elevated to a gyrating sifter. Albumen is packed into drums.

Powder likely to escape from dryer's exhaust is recovered in a 6-house bag-collecting unit, with 72 cloth bags (8 in. x 12 ft.) in each house. Every 5 min., exhaust into one of the houses automatically shuts down. And an eccentrically-driven automatic shaker releases powder from the 72 bags. Powder falls to the bottom of the dryer to be recovered by the drag chain.

Tranin's White Drying

Whites are pumped from transport tanks into six stainless steel jacketed fermenting tanks (6,000 lb. capacity). Heated whites are de-sugared over a 6-hr. period.

They are then piped through plastic tubing into 2-lb. capacity trays. These trays are loaded onto portable racks, holding 168 trays, which are rolled into a gas-fired, hot air dryer (capacity, 54 racks). Units travel down a two-rack-wide section of the dryer for 7 hr., then reverse their course on a three-rack-wide section (7 to 8 hr.). Product leaves this preliminary dryer at 20-25% moisture content.

Final drying is performed in a 5-track secondary unit, into which go rack-loads of albumen. This dryer holds 25 racks, and drying operation is completed in 9-10 hr.

Albumen is knocked out of trays into a portable flaker (800-lb. capacity) with ¼-in. screens. From here, it is charged into a hopper equipped with a bucket elevator that feeds into a 1,600-lb. blender.

Blended product is run through a pulverizer, screen, then drum-filled.

FE SPECIAL REPORT

Machine Breaks Eggs —*And Also a Big Bottleneck*

Replaces 6-8 girls by opening and separating 16 cases of eggs per hour, and saves 75% of space

Breaking eggs and separating yolks from whites has been—until recently—a tedious manual task defying mechanization.

But now this operation can be carried out by machine—as demonstrated by Seymour Foods, Topeka, Kan.

This company employs a unit running at a 26 case/hour rate, thus replacing 6 to 8 girl egg breakers. Also included is egg-washer equipment affording significant advantages.

Work on this development was initiated about 8 yr. ago by Charles Wilkey. Several years later, the Topeka company and W. F. & John Barnes Co., Rockford, Ill., helped perfect it.

Seymour uses 24 of the automatic machines to break and separate about 384 cases of eggs hourly—with 150 fewer girls. And today the floor space required is but a quarter of that formerly needed.

In addition, the new unit is more sanitary, since human hands do not contact the product. The single operator merely starts and stops the machine and inspects the broken out eggs.

What's more, the company now recovers more eggs from the broken out shells—an extra ¼ to ⅜ lb. per case.

The specially designed egg washer, also developed by Seymour, is built into the breaker-separator machine. Significant benefit is its gentle system of handling the eggs, thus curbing breakage. It also keeps product temperature down, and so checks bacteria build-up.

Washing Eggs

Let us see how this benefit-packed system operates at one of Seymour's plants:

Eggs are manually transferred, with an egg lifter, from case to chain-driven, rubber-roller conveyor that carries them through the enclosed washer (18x40 in.). Here, eggs are gently cleaned by a dozen 4-in. reciprocating Nylon brushes.

Detergent solution (142 F.) is pump-recirculated at a 50-gal.-per-min. rate over the brushes. Discharged eggs are air-dried by a 12-in.-dia. squirrel-cage blower. Built under the conveyor at this point is a candling system employing six 75w. light bulbs. A ½-hp. motor operates the blower, conveyor, and brushes.

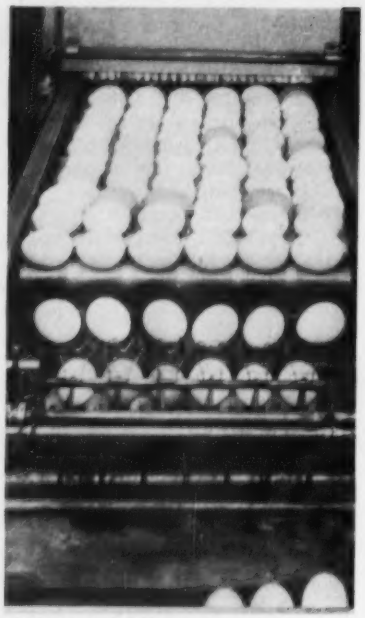
Reserve tank, located below washer, holds 25 gal. of detergent solution, and it can be cleaned in about 10 min.

Egg-feed to breaking machine is carried out automatically by six spring-actuated fingers mounted on two ¾-in. dia. horizontal metal rods. Moving in a 180-deg. arc, the fingers transfer six eggs at a time from washing machine rollers to 19 rubber vacuum-holding cups on the breaker. Eggs are firmly secured and released by the wire-fingers and cam-type locking and releasing devices.

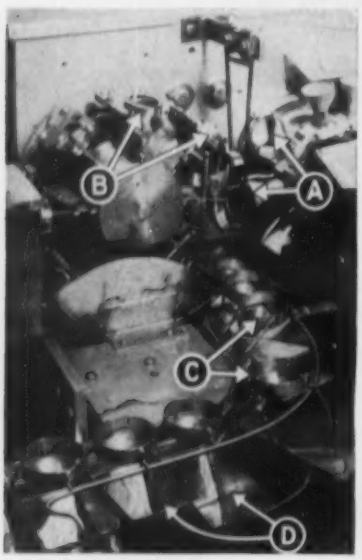
The 19 cups are driven by a rotary, octagonal vacuum head that exerts a 10 in. suction through a small opening at the bottom of each cup. As they make a 90 deg. turn, cups meet a rotary head containing eight

Closeups of Radical New Washing, Breaking, Separating Machine

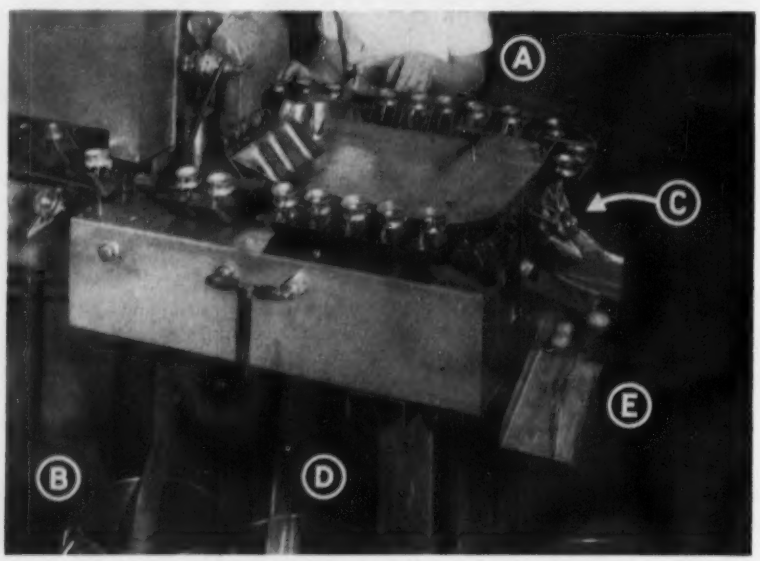
EGGS are transferred from cases to rubber rollers by a hand-operated lifting device. Dirties then pass through specially designed washer.



WIRE FINGERS move 6 eggs at a time from washer to breaking cups.



VACUUM CUPS (A) turn toward knives (B), where egg is cut in half. Yolks drop into cups (C), whites flow through cups into troughs (D).



LIQUID EGGS pass in front of inspector (A). Those of low quality are tripped into trough, and end up in reject pail (B). Good eggs pass to (C), where whites dump into trough and flow to pail (D). Yolks tip out at (E) and flow into collecting pail. Cups and troughs are then sterilized (left).

horizontal spring-actuated knives. A pair of guides secures each egg.

Breaking and Separating

After an egg is knifed in half, the two half shells are drawn apart and liquids drop into one of 36 chain-driven separating cups. Vacuum cup and egg cutter carry half shells away from the separating cup as rotary air jets, operating at 20 psi., blow remaining egg white from the halves.

Shells continue to a small chute, where they drop as vacuum is released from cups. Worm screws convey the waste out of the building to trash cans.

When yolks drop in the specially-designed, chain-driven separating cups, whites flow into tapered stainless steel troughs (2¼x5 in.) directly below them. The cups comprise a 2-in.-dia. hinged bowl that closes against a 1-in.-wide tapered ring. Both cups and collecting troughs make a complete circle as they are conveyed past breaking, inspecting, and separating stations along ¾-in.-dia. guide rods.

At the inspection station, a girl checks eggs with the aid of "black light," and rejects defects by tripping

yolk cup and white trough. Liquids drop on a chute that discharges into a reject pail (20-lb. capacity).

Normally, the trough travels along the line and is automatically unhinged at the second turn. Whites fall into a collecting-inspecting pan, then flow through a plastic tube to stainless catch pails.

Yolk cups continue along the line, held in a horizontal position by a 1x¼-in. metal tip, riding along a guide rail. When rail terminates, cup drops to discharge yolks into one of two chutes that terminate over bucket.

Now being installed at this point is an electronic device employing a photocell for distinguishing and separating light and dark yolks. This unit is a development of Mecca Div., Librascope, Inc., Santa Ana, Calif.

FE SPECIAL REPORT

5 Egg-Quality Properties Important to Food Processors

They range from • Chemical composition through • Nutritional value and • Bacteriological status to • Organoleptic qualities and • Functional Performance

In breaking operations, egg white tends to adhere to the yolk. For example, in 45% egg yolk solids, there is approximately 14½% egg white. And in 43% solids yolk, there is almost 20% egg white.

This is important to certain users of egg products. For instance, those manufacturing baby foods must keep the amount of whites at a minimum, as babies are often sensitive to egg white proteins.

On the other hand, it may be of more importance to bakers because of the lower coagulation temperature of egg white proteins, which effect egg yolk-coagulation during baking.

Of the salient egg-quality factors five are of primary concern to food industry users: Chemical composition, nutritional values, bacteriological status, organoleptic qualities, and functional performance.

1—Chemical Composition

Liquid egg white consists of: Water, 87.8%; solids, 12.2%; sodium chloride, 0.3%; protein, 10.7%; glucose, 0.38%; and cholesterol, 0.002%.

Chemical-wise, glucose content is of primary importance to users. Shelf-life of egg white solids is cut short by glucose-protein reactions that produce brown, insoluble products of undesirable flavor. Glucose is removed from all commercial egg whites by the methods already detailed.

The low amount of cholesterol (0.002%) indicates that naturally occurring egg white is almost void of fatty materials. However, poor processing operations can increase fat content (measured by the amount of yolk present) to as high as 0.05%. This added yolk definitely retards whipping ability of the egg white, and it can be one of the most important trouble-makers in bakery use.

Chemical composition of liquid egg yolk is: Water, 49.5%; solids, 50.5%; sodium chloride, 0.3%; protein, 16.3%; fat, 31.9%; and glucose, 0.17%.

Solids content of commercial egg yolk products are reduced from the laboratory figures above to a 43 to 45% level, due to adhering egg white.

Glucose in egg yolk is of lesser importance to manufacturers, because of the smaller concentration. But it is removed in essentially the same manner as in egg whites to stabilize product for greater shelf-life.

Also, yolks have a much more complicated chemical system because of the high fat content (about 57% on dry basis).

Of the fatty acids, about 30% are saturated and about 70% unsaturated. Thus, isolated egg oil is very sensitive to oxidation and softens at about 80 to 90 F.

However, shelf-life can be extended by refrigeration, gas packing, low moisture drying, glucose removal, or combinations of these techniques.

Of interest are complaints that drum-packed egg yolk solids held under refrigeration pick up moisture. Actually, say processors, this is not true. Primary trouble source is solidification of egg fat at low temperature —a condition that is overcome through proper tempering.

2—Nutritional Value

From a nutritive standpoint, whole eggs are an excellent source of biologically-efficient proteins. Yolks are a good source of fat, and a low carbohydrate content makes them very desirable for special diets. Eggs are also top sources of phosphorus, magnesium, potassium, sulphur, iron, and copper, as well as many trace elements.

Vitamins A, B, and D, choline, folic and pantothenic acids, and inositol are found in abundance in this product.

3—Bacteriological Status

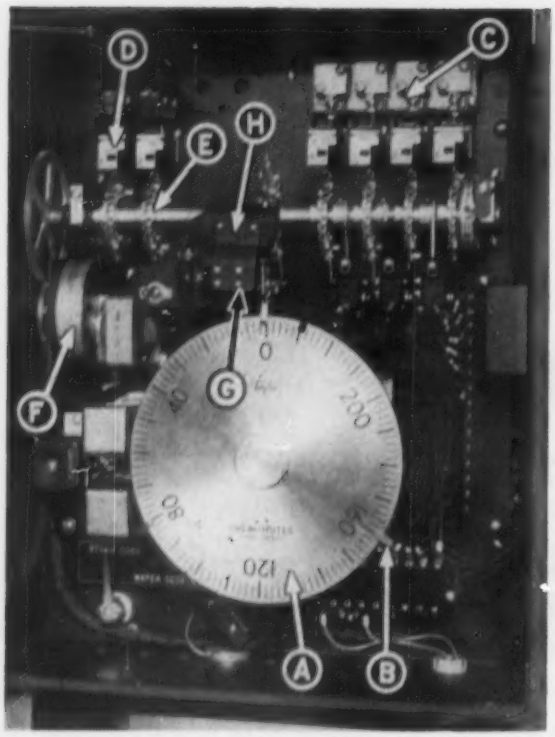
From the standpoint of sanitation, the egg—and even the shell—are sterile at the moment the egg is laid. However, contamination soon takes place if there are dirty nests, even though egg whites naturally contain several bacteria-inhibiting substances.

Sanitation-wise, egg processors have made tremendous advances since the war years.

Relatively new is control of egg products through pasteurization, employing high-temperature short-time units (about 143 F. for 3-3½ min.) that accomplish a 99.9% bacterial reduction in whole eggs and yolks!

Spray drying further cuts down on

(*Turn to page 191*)



ROBOT-LIKE REGULATOR primarily comprises time-measuring and process-actuating components. Time-gaging units include synchronous speed-timing motor and gear train that accurately rotates dial (A). Process program is set on direct-reading time dial by trip pins (B) that are clamped at required time graduations. Process-actuating parts consist of air-valves (C), electrical switches (D), step disks (E), and non-synchronous step motor (F). Through latch trip pins on step disks, motor operates electrical and pneumatic units in accordance with process program set on time dial.

With process determined, retort operator sets program trip pins to intervals at which operations must take place. Latch pins are also set in proper notches in step disks. Controller is then ready.

Operator pushes "Start" button until door-signal light comes on. Timing motor then starts rotation of time dial. Step disks advance to zero position, and any pin in zero-marked notch actuates a specific function at that setting, momentarily energizing and then stopping step motor. After a pre-set time, next pin on time dial reaches position to unlatch actuator (G) of timing switch (H). Step motor is then energized, step disks quickly move to next position, and second index-trip pin relatches timing-switch actuator to stop step motor.

Simultaneously, air valve or electric functions are started by latch-trip pins previously set in corresponding notch for first timed function. Time dial continues rotating, and it triggers next process function. Operation is repeated, and step disk advances another stage. This goes on until all functions have been performed and end of cycle is reached.

How Timed-Program Control

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

One long-standing need of processors of variety canned and glass-packed foods has been—

A foolproof, flexible, fully automatic system for attaining three retort-process changeovers—for steam cooking with or without pressure cooling, or water cooking with pressure control.

And now today, such a system has actually been installed in the canning department of a Midwest packer.

Specifically, it's a neat, small-"package" assembly of components for simple switching from one processing cycle to another. What's more, wiring and piping have here been drastically cut.

A development of Taylor Instrument Companies, this equipment was selected by the packer to prevent spoiled batches by relieving the retort operator of responsibilities attributed to improper manipulation of valves and process timing.

In this plant's canning department, complete control systems have been set up for automatic operation of each of 18 retorts. To run each, there is the simplified, "packaged" instrument-control unit (with temperature and pressure controllers) for swift process changeovers, and there's also a time-cycling, process-actuating, retort-control program (Taylor's Flex-O-Timer timed-program controller).

Automatic and Flexible

With the new system, this packer now quickly changes to any of three types of processes involved in retorting products in tin and glass.

So today, the plant makes direct settings with the new timed-program controller, which assures convenience, accuracy, and savings of time. This "robot" controller comprises a motor-driven, step-disk mechanism that regulates operations of one to eight electrically-or pneumatically-operated functions. Controller's time dial is equipped with movable program-trip pins for "on" and "off" retort functions.

Each pin is manually positioned to exact time at which a retort operation —like venting, cooking, or cooling—is to be carried out. Pin settings are then duplicated in the step mechanism by latch-trip pins set in corresponding notches.

As a result, retort operators no longer make computations (always subject to error) in setting up retort-processing cycles.

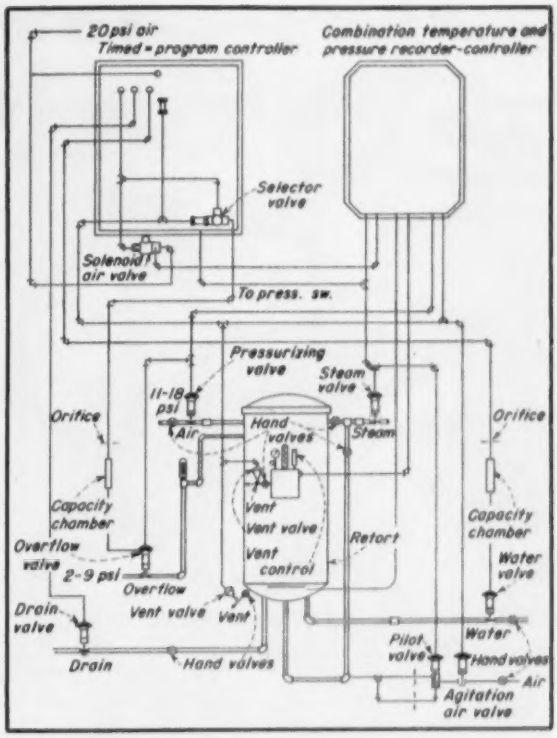
In the short time this multi-purpose system has been installed, it has exceeded all expectations with its trouble-free operations. Specifically, it has—

1. Completely eliminated errors common in manually-operated, retort-venting operations. No longer are there poor heat-transfer or possible spoilage from under-venting. Nor have there been production delays due to over-venting.

The time and the temperature of retort venting must first be completely satisfied before the instrument automatically switches operations to cooking. If, for example, steam pressure drops, venting continues until the pre-set temperature is reached. And from that point on, venting is automatically timed until a pin trips a switch to terminate the operation and then start the next one—cooking.

2. Abolished inaccuracies of conventional methods of manually timing retort cooking. Now, with retort operator no longer devoting his attention to timing the cook, there is no chance of

DETAILS of hookup to retort of timed-program controller and temperature and pressure recorder-controller. System automatically controls entire retort process cycle, involving venting, cooking, cooling, and blowing down. Minimizes operator's work and responsibility.



Already garnering numerous benefits for Midwest packer, system is implemented by automatic master controller. This unit's easily adjustable "pins" trip switches to actuate and time various retort-process steps . . . Swings over in jiffy to carry out three different cooking and cooling operations for tin or glass

Can *Invigorate* Your Retorting

spoilage from under-cooking or loss of product quality from over-cooking.

3. Permitted a fully automatic transfer of operations from cook to cool.

Air is now emitted into the retort to build up pressure and, thereby, prevent bulging of cans or popping of lids off glass jars. Seconds later, cooling water is automatically introduced at a controlled rate by a time-delay device, which consists of an orifice and chamber in the air line to the diaphragm valve.

Water is initially introduced at a low rate to avoid condensing of steam in the retort and consequent lowering of pressure. Water is then gradually fed at a higher rate to prevent excessive chilling of bottom containers.

4. Automatically compensated for variations in temperature, amount and pressure of cooling water.

Cooling is terminated when the timer runs out. Retort is then blown down to relieve pressure, and a drain valve is opened—all automatically.

5. Provided significant savings in water consumption, because of greater accuracy in feeding water into the retorts.

The timed-program unit brings pressure and temperature controllers and associated valves into operation at proper time and in proper sequence.

These operations are achieved by pneumatic valves and electrical switches inside the equipment. The basic switches are operated by pins on the step disk. Once factory-set, the pins need never be changed in the packer's plant, regardless of the processing cycle.

Process coordination is accomplished by four other pins on the perimeter of a large, easily visible time disk. These are color coded for easy recognition.

A black pin establishes the venting time for steam cooks. A gold one, set at zero on the time disk, is for the start of the cook. A red one is set at the time graduation for the approved processing cycle.

A fourth pin—green—is set on the perimeter of the disk for a sufficient elapsed time following end of the cook to insure proper retort-cooling of the product.

Under normal operation, only red and green pins need be reset by the cook-room superintendent or retort operator. All such resetting is carried out during changes in can or jar size, or product.

Once times have been established for a complete retort process, each succeeding retort load proceeds through a duplicate cycle after loading and locking and then pressing of the "Start" pushbutton. This button is located on the door of the time-program controller, along with a signal light that goes on when processing is in progress.

Versatile-Plus

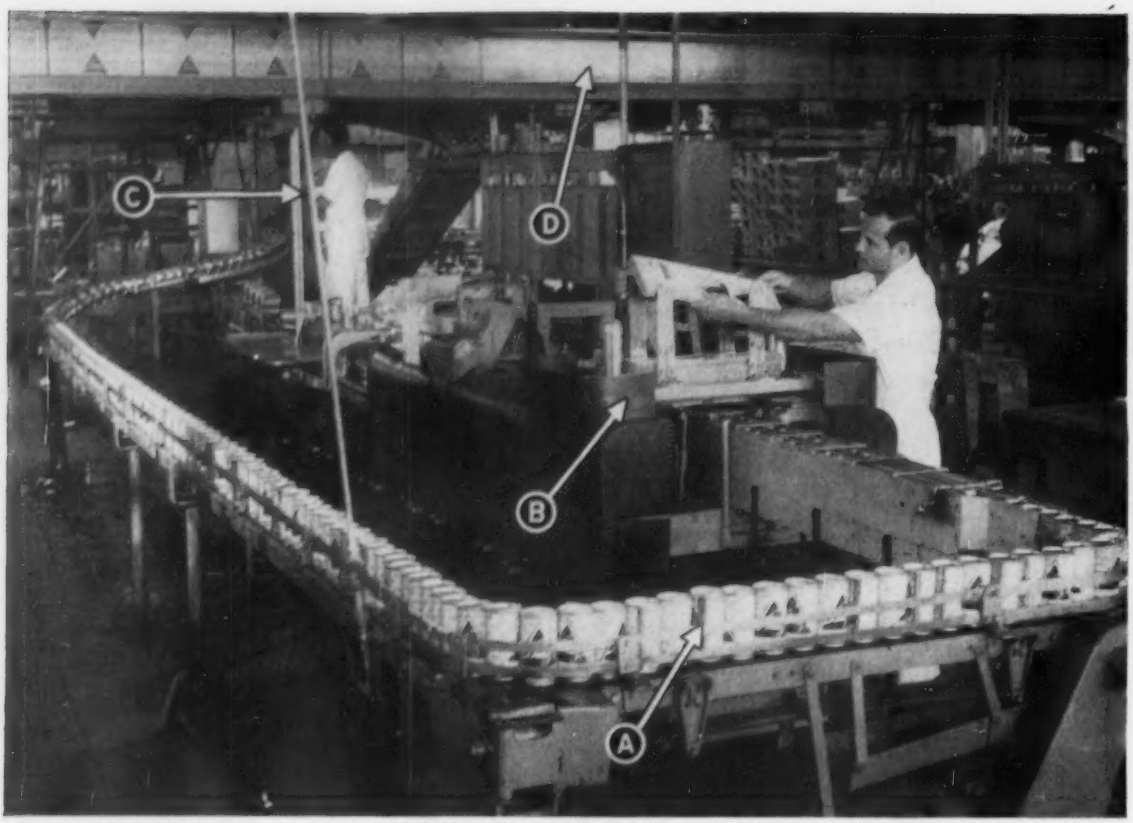
For steam cooking small cans, the process selector is set for "Steam Cook Without Pressure Cool". The red cook-time pin and the green cool-time pin are then properly set on the perimeter of the time disk for the product being processed.

After the proper temperature-control point is set on the temperature instrument, the operator loads and locks the retort then presses "Start" button.

Steam is now admitted to the retort, and venting goes on for 7 min., or until a retort temperature reaches 220 F. (to conform with requirements of the National Canner's Laboratories). Vent valve closes and, when retort is up to processing temperature, the timer starts.

At the end of the cooking time, the

(*Turn to page 159*)



NEW CARTONER forms economical 6-packs. Single row of cans (A) moves continuously into carton-packing machine (B). Finished take-homes then move on to semiautomatic caser (C), and the cased packs (D) go to shipping.

Take-Home 6's *at 150 a Minute*

—is striking Blatz performance using glueless cartoner on beer-canning line . . . Unit permits initial running by brewer of economical, lightweight all-kraft cartons . . . Machine adaptable for other can packs

C. J. KRUECK and C. W. SCHRAITLE

Chief Engineer and Bottling Maintenance Superintendent, Blatz Brewing Co., Milwaukee.
Photos by Fred R. Stanger, Milwaukee

There's been truly widespread acceptance of the multi-unit carry-home carton for packing beverages like beer and soft drinks.

Reason is the strong psychological stimulus of these handy packages in bringing the customer to purchase larger quantities more often.

Trouble in buying beverages prior to introduction of the "take-homes" (about 8 years ago) was the inconvenience in carrying the loose, weighty items from the grocery store. Either a customer had to make separate, infrequent store trips for cases of 24 or else tote home individual bottles a couple at a time in the bag of groceries.

Now convenient, easy-to-handle carry-home packs are available in 2 to 12 can-or-bottle packs—and at a savings.

Notable Economies

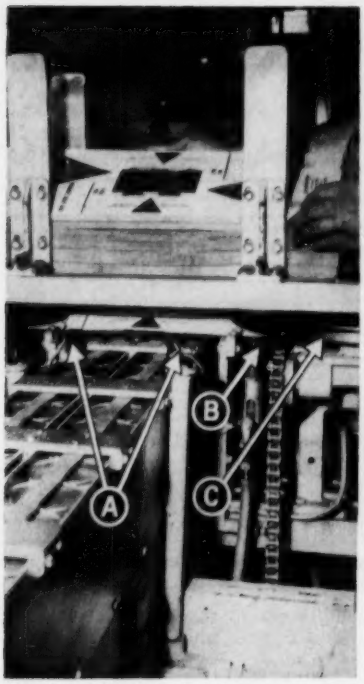
Significant in this trend toward packing canned or bottled beverages in multi-unit cartons have been the improvements in speedier-operating cartoning machines and paper-making techniques.

Specifically, our organization, Blatz Brewing Co. of Milwaukee, has adopted these advances to lower the cost of carton-packing six 12-oz. cans of beer. Here, savings are being attained by low-cost cartoning machines and cartons.

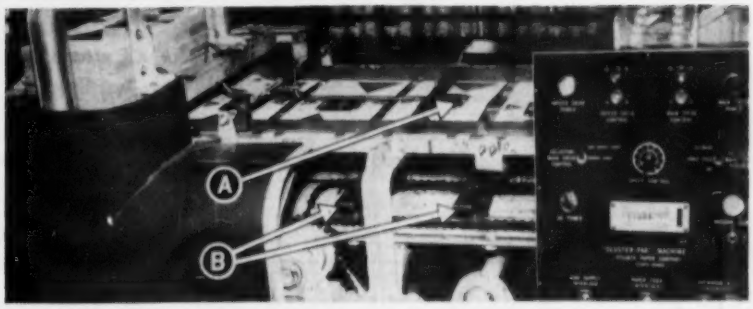
Key is a new straight-through machine that operates without stopping or off-setting. This is the Cluster-Pak, engineered by Atlanta Paper Co., Atlanta, to handle over 900 cans or 150 carry-homes a minute.

This high-speed machine has also enabled us to achieve still further economies. Utilized, for the first time, are cartons made from all-kraft, Southern pine paperboard. These are tough, lightweight, highly moisture-resistant,

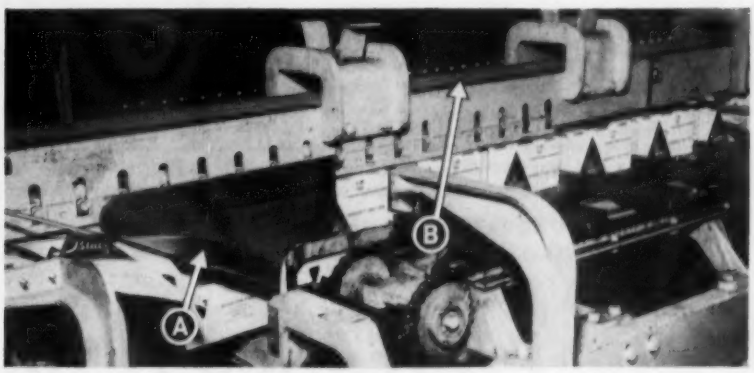
How Machine Operates in Straight-Through Cartoning



MICROSWITCHES (A) assure entry of gap-free, double row of cans to cartoner. Carton blanks are picked up one at a time by vacuum cups (B) and auger (C) and discharged on feed conveyor.



CARTON BLANKS (A) continue along feeder chain as plungers (B) on divider chain separate double-row cans into groups of six.



PLOW (A) makes first side folds over group of six cans. Compression belt (B) secures carton as it is automatically locked.

and more economical than conventional ones. What's more, less paperboard is required to form a carton around the cans.

This paperboard can be printed in vivid, lasting colors. And it is suitable for moist, refrigeration storage.

Notable economies have also been reaped at our plant through elimination of glue or staples. Instead, tight locking of cartons is accomplished by specially designed die-cut "arrows" in the underflap that machine-engage slots in overlapping bottom flaps.

Away-from-the-brewery benefits have also been chalked up. For instance, the carry-strap feature of our cartons (used instead of stand-up handles) permits better stacking for mass displays in retail stores. Open-ends on cartons, too, allow more rapid cooling of canned beer.

Our new-cartoned beer has now been successfully market-tested by Blatz throughout Wisconsin, and it has just recently been distributed on a nation-wide basis.

Aside from its use for beverages, the new take-home pack system of unitizing is also applicable for a wide variety of canned foods like soups, vegetables, baby foods, fresh and frozen fruits, and specialty foods.

Here are working details on the cartoner: An intake conveyor feeds cans single file from the pasteurizer into the Cluster-Pak machine, where a spring-loaded separator divides them into two rows. Speed of this stainless steel, table-top, chain belt is half again as fast as the cartoning machine. Cans then continue under a magazine that holds up to 600 flat die-cut carton blanks.

"No can-no carton" and "no carton-no can" devices have been installed. These comprise two microswitches directly ahead and another beyond the carton-feeding magazine.

NEW six-pack is self-locked without need of glue or staples.

First pair of microswitches (one for each row of cans) assures a full group of six cans to a carton by immediately stopping the machine in the event of a gap in any of the lines. Machine re-starts when can line is re-filled.

Similarly, if there is a break in the line of carton blanks discharged from the magazine, another pair of microswitches stops the cartoning machine.

Carton Feed Devices

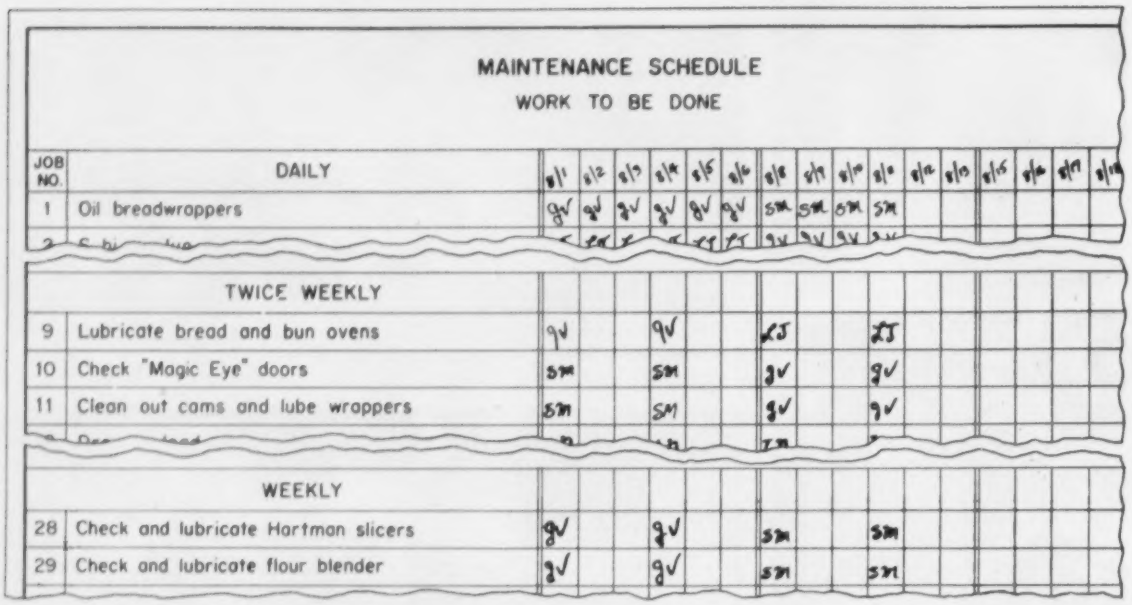
Cartons are stripped, one at a time, from the bottom of the magazine by a pair of rubber vacuum cups and revolving, horizontal-type augers. Pick up and release of cartons are achieved by two cam-actuated valves that apply and release the vacuum. Augers separate bottom-most carton from the stack and plow it onto traveling feed chains with small, equally spaced hooks.

These hooks engage the trailing edge of each carton, carrying it along the top of the cans and then under the compression section of the machine. It is during this stage that the cans are being formed into a group of six.

Meanwhile, as the double row of

(Turn to page 214)

Form That "Masters" Easy Keep-Tab System



MAINTENANCE SCHEDULE
WORK TO BE DONE

JOB NO.	DAILY	8/1	8/2	8/3	8/4	8/5	8/6	8/8	8/9	8/10	8/11	8/12	8/13	8/15	8/16	8/17	8/18
1	Oil breadwrappers	gv	gv	gv	gv	gv	gv	sm	sm	sm	sm						
	TWICE WEEKLY																
9	Lubricate bread and bun ovens	gv			gv			xj			xj						
10	Check "Magic Eye" doors	sm			sm			gv			gv						
11	Clean out cams and lube wrappers	sm			sm			gv			gv						
	WEEKLY																
28	Check and lubricate Hartman slicers	gv			gv			sm			sm						
29	Check and lubricate flour blender	gv			gv			sm			sm						

COMPREHENSIVE WORKSHEET, centrally located in machine shop, keeps mechanics posted on entire maintenance schedule. Plant engineer can tell at a glance how work is progressing as men initial completed jobs.

Prevention Is the Crux
In This *Positive* Maintenance-Safety Plan

Master schedule and work card system—that any plant can adopt—ups mechanic-efficiency and cuts machine down-time for this bakery chain

WALTER J. HOLMES
Special Correspondent, Mandarin, Fla.

Breakdowns are stopped before they start, now that a carefully planned preventive maintenance schedule has been put into effect at all plants of American Bakeries Co.

Safety, too, is on a prevention basis, with plant committees meeting regularly to thrash out accident-hazard problems *before* someone gets hurt.

The maintenance program has been evolved from experience data gathered by the company's chief engineers. And management gives the new system credit for boosting work of the mechanic force from a former low of 60% efficiency to its present high of 85-90%.

Main cogs in this organization are the various plant engineers, who look after buildings and equipment and supervise crews of mechanics.

Along with the company's head regional engineer, this supervisor works out a list of tasks to be done by the shifts on each specific day of the week. The information is entered on a master record, and each job listed is given a number, used as a time-saver in identifying that particular work. Included for each chore on the card is an estimate, based on company-wide experience, of the time required to do it.

From this record there is prepared a large worksheet called the *Maintenance Schedule* (see first illustration). It is hung in a glass-enclosed case in the machine shop—where it is handy for the mechanics to consult it. Since American Bakeries divides its work-year into 13 four-week periods, this sheet is laid out to provide a record on all equipment during these periods. Separate charts are maintained for bread and cake departments.

Left side of the *Maintenance Schedule* lists the numbered job activities under daily, weekly, monthly and yearly headings, depending on how often the tasks must be performed. As each job is carried out, worker places his initials in the proper square to show completion.

In addition to this record, the plant engineer daily fills out an individual work card for each mechanic. Carried by the workmen, this card outlines by number the jobs he is to accomplish on his shift.

As he finishes each one, the mechanic jots down the actual time it took. This provides invaluable information for future scheduling. Further, it is the plant engineer's assurance that the assignment has been completed. If, for some reason, the mechanic finds he must skip a given task, he carefuly notes the reason. Then that job may be re-assigned by the engineer.

One of the principal program objectives is to see that a mechanic does

not do the same jobs constantly. Diversification has the double advantage of making him familiar with other assignments while reducing the routine monotony of his work.

To assure prompt attention to needed work, there is the *Emergency Repair Requisition* (see illustration) that is filled out by department heads and submitted to the maintenance department.

Close Check On Motors

Company engineers have also devised a highly effective system for servicing and general maintenance of motors. In each section of the plant a metal holder, mounted on a board, carries cards for all motors in that particular section.

One side of each card shows the running maintenance record — last date inspected, name of mechanic doing the work, and date on which another inspection is due. The opposite side gives information pertaining to the motor itself — manufacturer's name, motor serial number, horsepower, motor type, instructions for re-ordering parts and a notation as to how often inspection should be made.

As a double precaution that the inspections will be made on time, the plant engineer lists "check motor boards" on the Maintenance Schedule as a regular assignment.

To assist in individual plant engineering programs, "roving" mechanical supervisors travel about periodically and are always on call. These men do special trouble-shooting and consultation work with the plant engineers.

For the most part, American Bakeries follows manufacturers' recommendations as to equipment parts that should be carried in stock. Here, the traveling mechanical supervisors are able to offer valuable advice based on experience gained from plant to plant. The company affords each plant a feasible budget to carry out this repair-parts program.

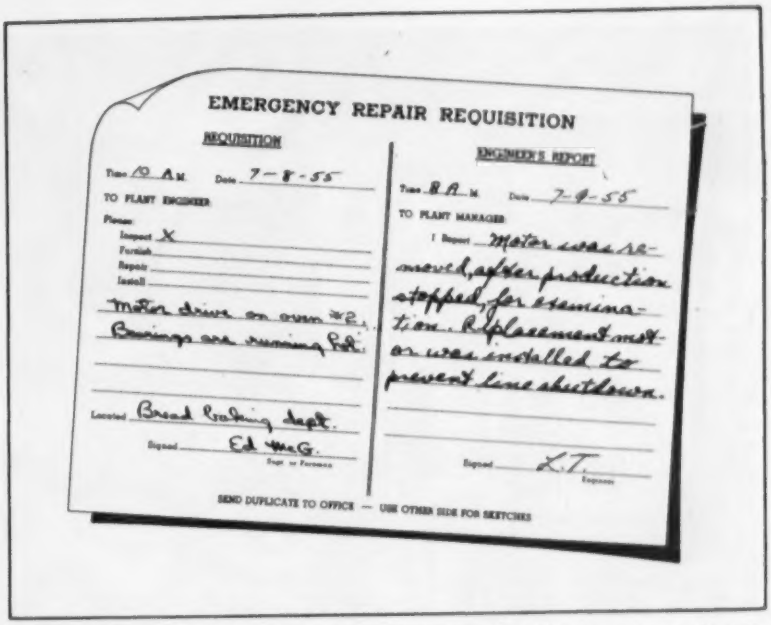
Plans are already underway to expand the scheduling system into other departments, such as sanitation, where company officials believe it will work equally well to boost efficiency.

Safety Scheduling

The safety program at American Bakeries varies slightly with different plants. But standard procedure calls for rotating safety committees. These groups meet weekly, with the plant engineers. Each committee is composed of from five to eight workers chosen by department heads and the plant manager.

In some locations, the plant man-

(*Turn to page* 228)



EMERGENCY REPAIR REQUISITION

REQUISITION

Time 10 A.M. Date 7-8-55

TO PLANT ENGINEER

Please: Inspect X, Furnish, Repair, Install

Motor drive on oven #2. Bearings are running hot.

Located Bread cooling dept.

Signed Ed MacG. Dept. or Foreman

ENGINEER'S REPORT

Time 8 A.M. Date 7-9-55

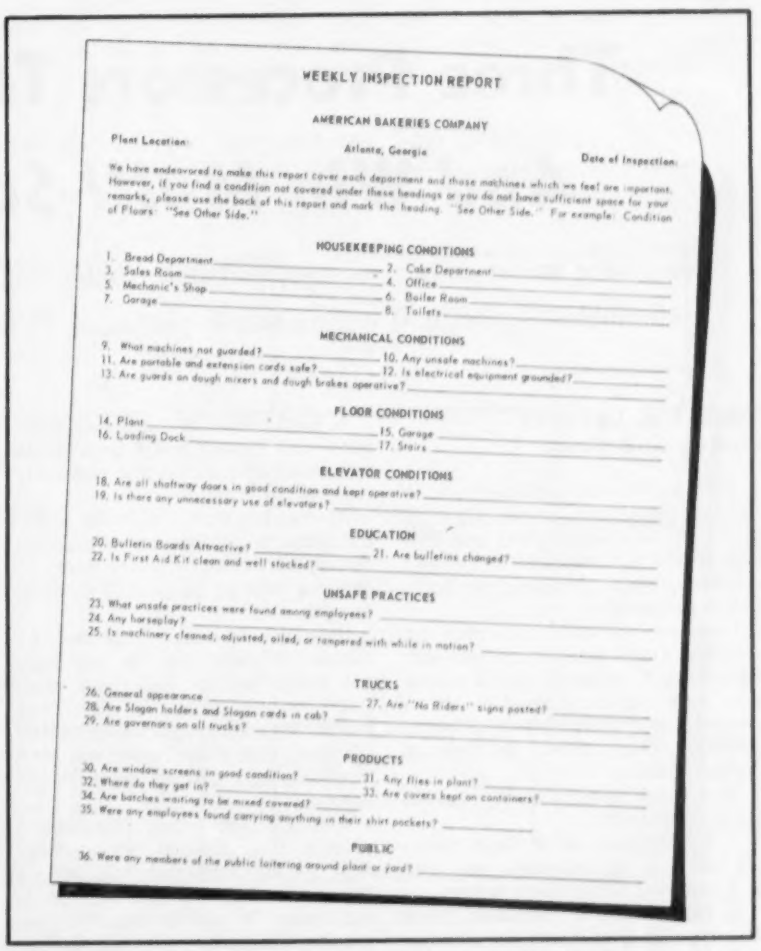
TO PLANT MANAGER

Report: Motor was removed, after production stopped, for examination. Replacement motor was installed to prevent line shutdown.

Signed L.T. Engineer

SEND DUPLICATE TO OFFICE — USE OTHER SIDE FOR SKETCHES

COMPACT FORM implements fast maintenance action. Plant manager gets completed paper, easily grasps situation and its correction.



WEEKLY INSPECTION REPORT

AMERICAN BAKERIES COMPANY

Plant Location: Atlanta, Georgia Date of Inspection:

We have endeavored to make this report cover each department and those machines which we feel are important. However, if you find a condition not covered under these headings or you do not have sufficient space for your remarks, please use the back of this report and mark the heading "See Other Side." For example: Condition of Floors: "See Other Side."

HOUSEKEEPING CONDITIONS

1. Bread Department 2. Cake Department
3. Sales Room 4. Office
5. Mechanic's Shop 6. Boiler Room
7. Garage 8. Toilets

MECHANICAL CONDITIONS

9. What machines not guarded? 10. Any unsafe machines?
11. Are portable and extension cords safe? 12. Is electrical equipment grounded?
13. Are guards on dough mixers and dough brakes operative?

FLOOR CONDITIONS

14. Plant 15. Garage
16. Loading Dock 17. Stairs

ELEVATOR CONDITIONS

18. Are all shaftway doors in good condition and kept operative?
19. Is there any unnecessary use of elevators?

EDUCATION

20. Bulletin Boards Attractive? 21. Are bulletins changed?
22. Is First Aid Kit clean and well stocked?

UNSAFE PRACTICES

23. What unsafe practices were found among employees?
24. Any horseplay?
25. Is machinery cleaned, adjusted, oiled, or tampered with while in motion?

TRUCKS

26. General appearance 27. Are "No Riders" signs posted?
28. Are Slogan holders and Slogan cards in cab?
29. Are governors on all trucks?

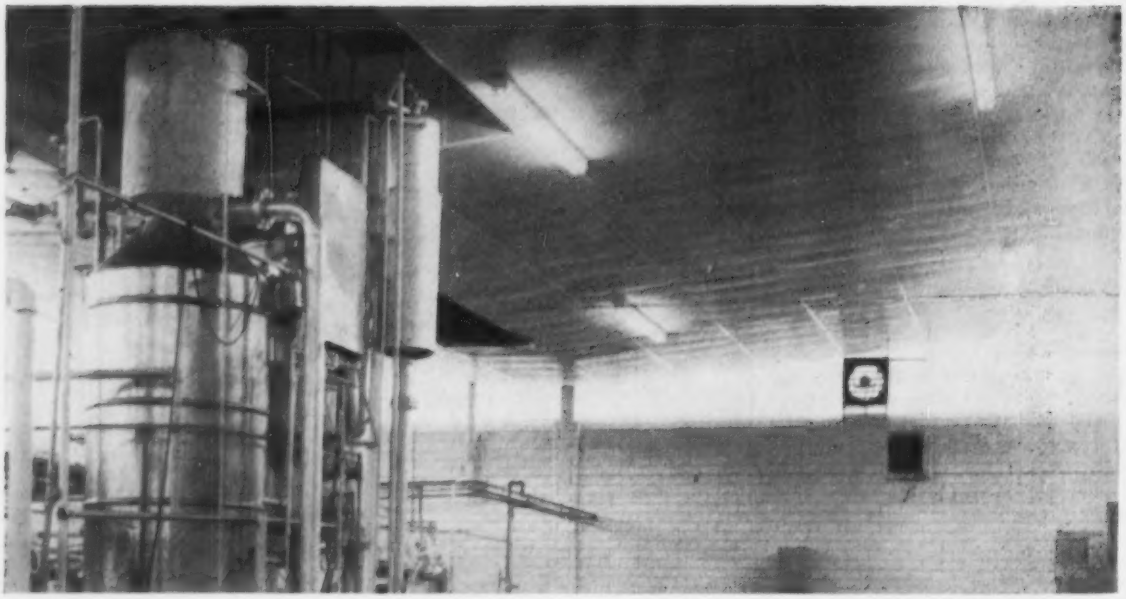
PRODUCTS

30. Are window screens in good condition? 31. Any flies in plant?
32. Where do they get in? 33. Are covers kept on containers?
34. Are batches waiting to be mixed covered?
35. Were any employees found carrying anything in their shirt pockets?

PUBLIC

36. Were any members of the public loitering around plant or yard?

PERMANENT RECORD of accident hazards is provided by this sheet that is used by plant safety engineer and committee in weekly inspection trips.



FLUTED Fiberglas panels above ceramic tile walls flood huge processing room with sunlight. Ceiling of 4½x2-ft. Transite panels gives ready access to utility lines suspended from roof beams.

Three Processors Team Up *And Win Multi-Savings*

Ice cream maker, mix producer, and milk dealer build combination plant that eliminates duplicate ¶ equipment, ¶ personnel, ¶ deliveries, and ¶ sales

ROBERT A. LATIMER
Special Correspondent, Denver

You can—as now witnessed out in Denver—consolidate several types of operations in a single plant and thus gain notable new economy and greater efficiency, while abolishing multiple-delivery expenses.

Here, an ice cream manufacturer (Evalona Dairy Co.), a mix producer (Broadway Creamery), and a wholesale milk dealer (Dairy-Lea dairy) banded their operations in a single $300,000 plant under the title of United Dairies.

As a result, marked savings are being realized from—

1. Employment of a single boiler for all heat requirements, and use of a common refrigeration system.

2. Interchange of personnel from one type of production to another.

3. Combining of office and sales work, and

4. Elimination of duplicated deliveries—with 9 small and 4 large trucks now handling the runs that previously required 25 vehicles.

At the beginning of 1954, when the plans to combine were first discussed, all three companies were undergoing growing pains with no room to grow.

Broadway Creamery, operated by Edward Watson and his son Jack, was established in 1921 as a retail dairy products store. Its plant was located in a congested south Denver shopping area where space was at a premium, and parking space almost non-existent.

Through the years, Broadway's business had changed considerably, with manufacture and sale of ice cream mix assuming the bulk of its operations. Its market includes New Mexico, Colorado, Nebraska, Kansas, and parts of South Dakota.

Evalona Dairy, with two ice cream stores, was similarly troubled by inadequate space.

Dairy-Lea was somewhat less harried by these problems. But it stood to benefit tremendously by modernization and addition of new equipment.

How It Started

The Watsons touched off the one-team idea by making a thorough analysis of the future prospects for their business in Denver, as gaged against construction costs, availability of locations, and transportation facilities. In mid-1954 Samuel Bish, head of Evalona, and J. E. Stults, of Dairy-Lea, were consulted and agreed to enter the project.

And so, United Dairies was organized, with Mr. Watson as president, and Messrs. Bish and Stults as vice-presidents.

Deciding the time was propitious

to begin construction, they selected a convenient, centrally located site along the Platte River in the center of Denver's Valley Industrial district. Then came designing of the plant, with each officer taking a hand. Called for in the final plan was a single large processing area flanked with a battery of smaller supply rooms.

Completed in less than six months, the 30,000-sq.-ft. single-story, rectangular structure is finished in rose brick and buff concrete. Walls of all production areas are of ceramic tile. General and executive offices, driver salesmen's room, and reception room are located at the right front corner of the building.

Remaining space is occupied by the 60x111 ft. central processing room and the smaller departments that completely surround it. In design, the new plant resembles a "rectangle within a rectangle" (see accompanying drawing).

An observation deck, directly above the offices, gives a commanding view of the plant's interior through a series of soundproof windows. The deck, which incorporates such facilities as lavatories and also a small kitchen for food preparation, will be used as a public relations tool. Interested groups of adults and children will be brought to the plant for tours, which will include refreshments as well as explanations of the various manufacturing processes.

A unique feature of these tours will be the "wired" guide, who will walk from department to department in the processing area carrying a microphone on a 150-ft. extension cord. He will "broadcast" details as he points them out to the audience in the observation room. This method will make it possible to handle larger groups without interfering with production or risking injury to visitors.

Carefully Engineered

Numerous architectual innovations have been incorporated in the new plant. For example, translucent plastic paneling is used above the 15-ft. ceramic walls of the processing room —greatly reducing illumination costs. Specifically, this is a 5-ft. high insert of "vertical" sky lighting, in the form of fluted Fiberglas panels, extending the full 300-ft. distance around the area. It provides daylight illumination through operating hours, and it aids working comfort by reflecting heat.

The planners of United Dairies prepared in advance for such contingencies as moving water and power lines —by installing an "inverted ceiling" over the production area. This consists of a steel framework extending from sidewall to sidewall and supporting some 300 panels (4½x2 ft) of Transite, a composition of asbestos and concrete. Ceiling slopes toward the center of the area. The feature is that these panels may be lifted out to give access to the attic space.

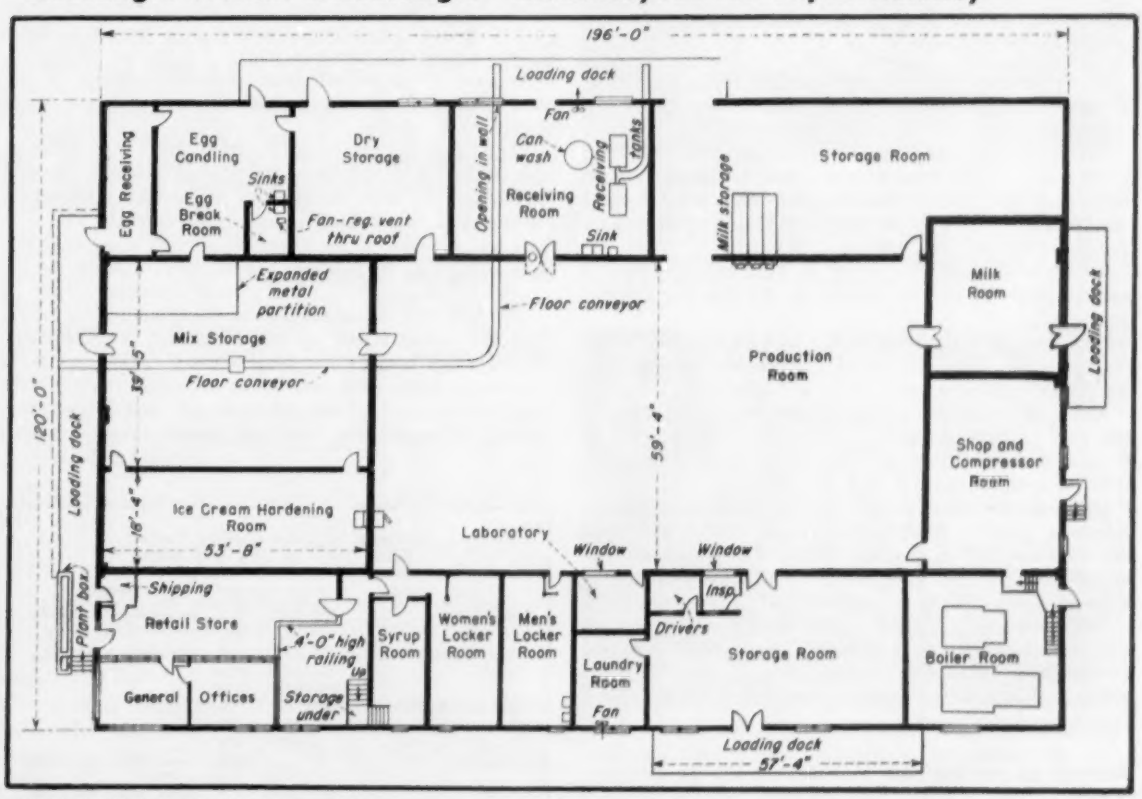
Above this ceiling are steel roof trusses that eliminate the need for supporting columns in the production area. Water and steam lines, ventilating ducts, and electrical service lines are all hung from these trusses.

A bus duct runs about 80-ft. down the apex of the ceiling in a recessed, inverted trough. It provides ready admission of electrical power to any point in the area by means of suspended cables. Original plan was to tap all current from this bus. However, it proved necessary to provide some under-floor cable and piping in the Hydroment waterproofed-concrete floor.

While the operating departments are, of course, in close juxtaposition, each of the three areas is a complete

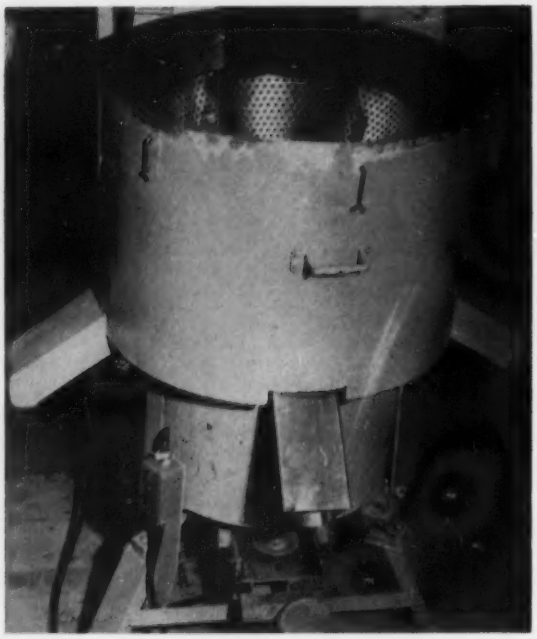
(Turn to page 205)

"Rectangle Within a Rectangle" Gives Layout for Top Efficiency



THREE-PRODUCT PLANT is specially arranged for streamlined production—with a large central processing room encircled by equidistant smaller departments for direct, speedy flow of all operations.

SPECIAL CENTRIFUGAL EXTRACTOR, developed by University of Hawaii researchers, separates passion fruit juice sacs from rind. Here, cover is removed to show perforated basket. Rinds discharge through right and left chutes. Juice and seeds flow from center trough. Unit will handle 2 tons per hour. →



Efficient Extraction, Single-Strength Technique Open Up—

Wide Uses for New Passion Fruit Juice

FRANK P. BOYLE, THOMAS N. SHAW and G. DONALD SHERMAN

Food Processing Laboratory and Department of Soils & Agricultural Chemistry, University of Hawaii

A new frozen juice product—derived from the exotic passion fruit—has now been perfected at the University of Hawaii.

Developed originally as a concentrate (FE July '52, p. 94), this latest form is put up as a single-strength drink base that readily dilutes in the same ratio as most concentrates (3 or 4 to 1), while still retaining its distinctive aromatic, tart, and refreshing flavor.

This base is made by adding 60 parts of sugar to 100 parts of juice (by weight). Resultant dilution has a bright orange color.

► **It makes a pleasing drink alone. And for punches, it has been found to blend well with other juices, such as pineapple, peach, apricot, pear, apple, and citrus.**

At the Hawaiian laboratory, studies of growing, harvesting, and product preparation have led to important new facts, as well as development of new extracting apparatus. Broad uses of the product are being explored.

► **Very palatable lab developments have been sauces, icings, toppings, gelatin desserts, fruit cups, salads, and salad dressings employing the new juice. Further, a number of new pastry recipes using the juice have been tried, with a passion-fruit chiffon pie winning outstanding praise.**

Also, passion-fruit sherbet—sold both in commercially finished form and as a homemade "ice box" dessert—won wide acceptance in Hawaii last year. In addition, a small juice pack was successfully marketed in 46- and 96-oz. institutional containers.

Acreage on the Increase

The yellow passion fruit—*Passiflora edulis flavicarpa*—has been found most suitable for the juice product because of its higher acidity. The fruit has grown wild on perennial vines that attach themselves to forest trees at low elevations. This source has supplied a considerable amount of processing fruit. However, commercial plantings have been pushed during the past two years.

At least 300 acres will bear fruit during 1955. Thus, on a basis of 10 tons/acre yield, the crop will run some 6,000,000 lb. of fruit.

Many experiments in propagating, trellising, pruning, and fertilizing of the vines are now in progress, so new knowledge will soon supplement the earlier information contained in U. of Hawaii Extension Circular 345.

Harvesting and Processing

The ripe fruit is harvested from the ground after falling from the vines. Raked up and filled into boxes or bags, it is then delivered to the plant, where a grading operation eliminates fruit with soft and decaying rinds. Half-ripe and green fruit are set aside for further ripening. Sound, fully matured ones are rinsed to remove dirt

(Continued on page 184)

Closeup of Juice Quality Factors Shows High Acidity and Sugar

Quality Factor	Range	Average	Comments
Soluble solids	13.0-18.0	15.0	Measured by refractometer
pH	2.8-3.3	3.0	
Titratable acidity, %	3.0-5.0	4.0	Calculated as citric acid
Color	Light to deep orange	Bright orange	
Total sugar (g./100g.)	9.3-11.6	10.0	
Reducing sugar (g./100g.)	6.2-7.8	7.0	
Vitamin C (mg./100g.)	7.0-20.0	12.0	
Vitamin A	.....	570.0	Measured as International Units
Flavor	.....	.....	Fresh, clean, aromatic, tart, no off-flavor

Very Latest Handling Units

Viewed at Big NMH Show in Chicago

ACCELERATED technical advances were reflected in the wide range of equipment displayed by 250 companies at the recent 6th National Materials Handling Exposition in Chicago, which drew 30,000 executives from 40 countries.

Marking the newer developments were means making it possible for a single operator to move huge loads, and for lift trucks, trailers, and conveyors to work without operators.

Unique was use of a television camera by an exhibitor whose machine was too big to bring into the hall. This unit, set up two miles away, was viewed by visitors through a closed circuit TV screen. And they even directed its operations by two-way radio.

Outstanding were two displays (illustrated next page): First, a driverless trailer train designed to travel through a factory to shipping department. Shown by Barrett-Cravens Co., this train is pushbutton-guided by radio impulses.

Second was a model conveyor unit featuring an electronic "brain" and electro-magnetic "memory". Set up by Dasol Corp., this system picked items from 23 order-filling stations in a warehouse and moved them, by pushbutton control, to trucks.

Additional displays (not illustrated here) were:

Level-O-Meter which, when attached to a fork truck mast at operator's eye level, shows where forks are tilted and if level. Maker: Pallet Sales Corp., New York City. (95A)

Rotary truck leveler, which raises or lowers entire rear section of truck or trailer to bring bed on level with loading dock. Exhibitor: Rotary Lift Co., Memphis. (95B)

Lightweight magnesium dolly for handling palletized loads in and out of rail cars and trucks. Displayer: Magline, Inc., Pinconning, Mich. (95C)

Pallet dispenser that works by pushbutton to eliminate manual handling. Manufacturer: J. W. Greer Co., Wilmington, Mass. (95D)

Package strapper, electric-powered, that binds units with steel strappings at rate of 1,000 ties per hr. Also displayed was a glass-filament re-inforced strapping tape. Shown by A. J. Gerrard & Co., Melrose Park, Ill. (95E)

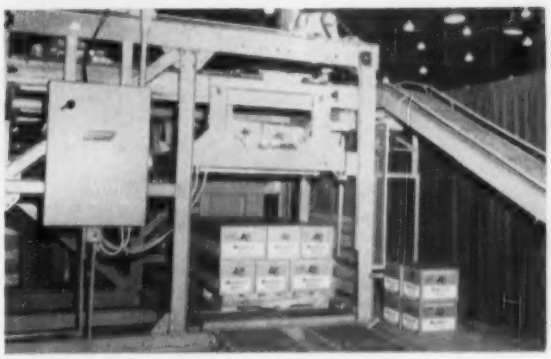
Dual-purpose lift control, comprising lever working in "H" pattern to operate fork hoist (left pattern) and mast tilt (right). Displayer: Lamson Mobilift Corp., Portland, Ore. (95F)

New light toting pans of exceptionally high strength. Fabrication here is of Fiberglas re-inforced with polyester reins. Exhibitor: G. B. Lewis Co., Watertown, Wis. (95G)

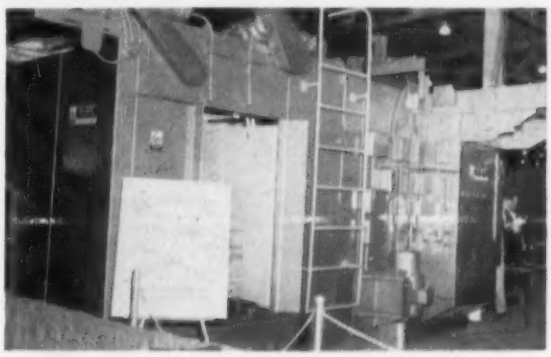
Long-Lasting pallets of metal-capped type, displayed by Pallet Sales Corp., New York City. (95H)

3 PALLETIZERS:

Pushbutton-operated units neatly, speedily, and economically load cases onto pallets



FLEXIBLE-TYPE palletizer loads up to three times as many cases as done manually. Handles different size cases in varying patterns at changing loading rates. Automatically puts on desired number of tiers preset by convenient selector switch. Is flexible for variety loads. Maker: J. W. Greer Co., Wilmington, Mass. (95I)



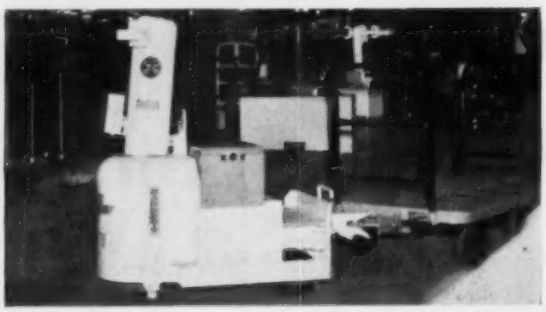
AUTOMATIC machine palletizes up to 36 cases per min. Operator sets desired package pattern on simplified selector panel, then cases load onto pallets in specified number and arrangement. Unit palletizes cases in interlocking pattern. Empty pallets are fed to magazine.—Food Machinery & Chemical Corp., Riverside, Calif. (95J)

THIS mechanically-operated pallet loader was built for soft-drink field to form 36x42-in. locked pallet load, with six tiers of seven cases per tier. Power supplied for machine and conveyors from 3-hp. motor. Air in at minimum pressure of 80 psi. Manufacturer: Beacon Machinery, Inc., East St. Louis, Ill. (95K)

2 SPECIAL MOVERS:

One a conveyor with built-in electronic memory
Other a driverless trailer that tours factory

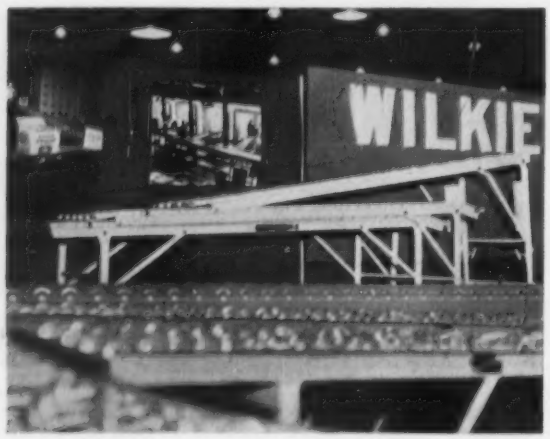
OPERATING MODEL of an automated materials handling and order picking system, activated by electric brain with electro-magnetic memory. When button is pushed, materials automatically route along conveyor to any predetermined station without further manual assistance. Featured by Dasol Corp., N.Y.C. (96A)



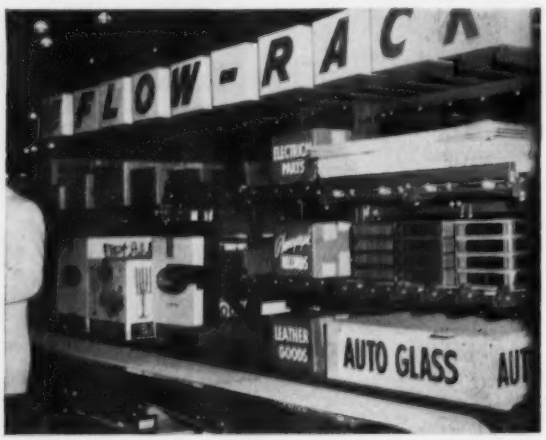
FULLY LOADED tractor train makes its way, without operator, through plant to shipping department. Radio waves controlling truck are transmitted via wires by signal boxes installed throughout plant. "Sniffer" box on truck has electronic brain to pick up waves from wire.—Barrett-Cravens Co., Northbrook, Ill. (96B)

4 CONVEYORS:

Featured are telescopic conveyor, flow rack, diverging line, and wire-belt turntable



THIS LATEST conveyor telescopes on roller bearings located at end of each frame. Designed for loading and unloading trucks and box cars, it fully extends in less than 5 sec. Self-adjustment serves to compensate for trucks of different heights. Compact unit is easy to maneuver. Displayer: The Wilkie Co., Philadelphia. (96C)



NEW FLOW-RACK simplifies task of receiving, storing, controlling inventory, order selecting, and shipping. Unit is combination of steel rack storage uprights, with cross members and conveyor wheels or rollers set at slight pitch so items placed in rack move forward.—Rapid-Standards Co., Grand Rapids, Mich. (96D)

DIVERGING CONVEYOR separates one line of cases into two lines of any desired proportion. Electric eyes are set across receiving lines to keep each filled to required capacity, regardless of fluctuations in the demand for cases. Manufacturer: Standard Conveyor Co., North St. Paul, Minn. (96E)

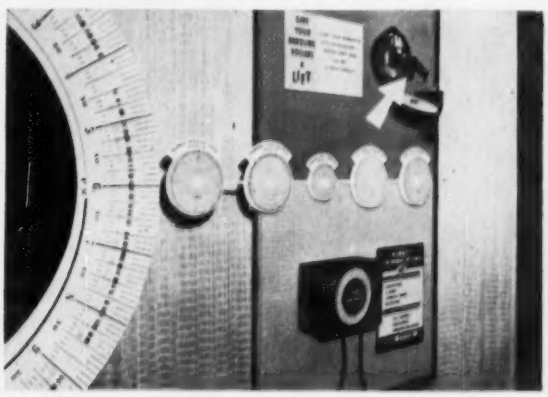
WIRE-BELT TURNTABLE conveys products-in-process, cartons, or packages around 90 and 180 deg. turns. Handles loads up to 100 lb. at belt speeds up to 50 ft. per min. Versatile belt features shaft-and-gear drive that assures positively driven, accurately timed operation. **Maker:** J. W. Greer Co., Wilmington, Mass. (96F)

2 MOVERS, 2 AIDS: Latest in fork-lift trucks . . . LP gas cylinder . . . Recorder to gage performance of materials handlers

LIGHTWEIGHT, sturdy lift truck has built-in battery charger. Traveling speed: 1-3 mph. Elevating speed: 28 ft. per min. Lowering speed: 20 ft. per min. Concealed microswitches automatically stop forks at top of lift and cut power from machine when brake is applied.—John Morrell Mfg. Co., Elgin, Ill. (97A)

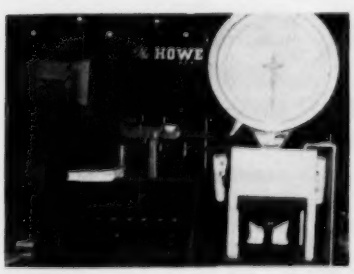
WALKIE-WORKLIFTER transports and stacks pallets, drums, skids, and other loads, up to 1,000 lb. Features two-way safety brake. Operated by pushbutton mounted at end of steering wheel for forward and reverse movement. Direction-selector switch is within easy reach on steering handle—Economy Engineering Co., Chicago. (97B)

TWO-PIECE lightweight liquified petroleum gas cylinders can be mounted on industrial lift trucks. Stated to permit lowering of fuel costs, raising of engine efficiency and life, reducing of maintenance, eliminating of dangerous exhaust fumes, and longer lubricating life. Cylinder manufacturer: Pressed Steel Tank Co., Milwaukee. (97C)



RECORDER (arrow) keeps record of productive lifts (raising or lowering of predetermined loads) of industrial trucks. Busy and idle time of trucks also recorded. Chart shows only lifts of minimum weight or greater. One stylus records lifts, other running time of truck.—Service Recorder Co., Cleveland. (97D)

3 SCALES: For automatic batch weighing, classifying of cartons, and remotely recording weights

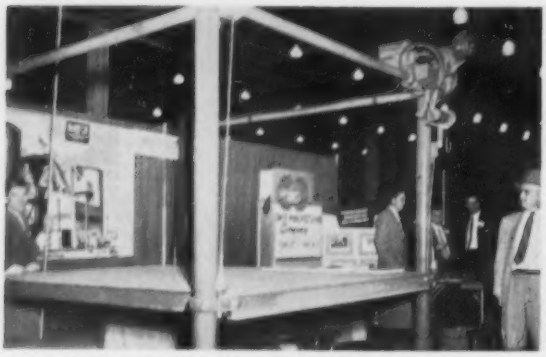


REVOLUTIONARY scale provides automatic control in proportioning ingredients by weight into mixers. Operator crank-sets potentiometers to weight figure on indicator. Then push of button starts proportioned ingredients flowing in sequence to batch mixer.—Howe Scale Co., Rutland, Vt. (97E)

CARTON CLASSIFIER automatically checks packages against predetermined standards. Accurate photoelectric controls, set to predetermined weight, divert partially filled cartons, or those with broken containers, to reject station. Also checks cartons not individually packaged.—Toledo Scale Co., Toledo. (97F)

ELECTRONIC unit seen here remotely records weights to accuracy of 0.1% of dial-chart capacity. It operates with standard electrical components at 1,000-ft. distance from scale. Printing is pushbutton-controlled on control panel of recorder. Maker: Howe Scale Co., Rutland, Vt. (97G)

4 DOCK LOADERS: Advances in dockboards simplify loading and unloading of trucks



EASILY INSTALLED electrically operated platform is designed for loading trucks, trailers, and rail cars, as well as to take place of ramps and stairs for lift work. Lifting power supplied by electric motor operating simple cable mechanism that raises checkered steel plate platform.—Globe Hoist Co., Philadelphia. (98A)

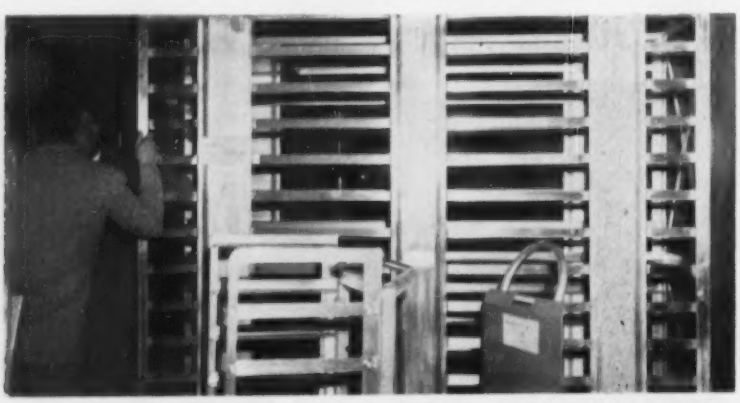
SAFETY CURB on dockboard prevents damage to power truck tires (note worn tire). Also new warehouse bag-truck (left), made of lightweight magnesium, has special tip-up design that prevents truck from rolling—even on inclined surfaces. Manufacturer: Magline, Inc., Pinconning, Mich. (98B)

FOUR-WAY dockboard is readily adjustable for raising, lowering, or side-to-side shifting (up to 10 in.). Assures safe and positive bridge between dock and carrier. Easy-to-mount rubber dock bumpers absorb shock and prevent injury to truck bodies and frame, also reduce dock repairs. —Karl A. Herman Co., Grand Rapids, Mich. (98C)

AUTOMATIC dockboard adjusts to varied vertical and horizontal positions for rapid and safe loading and unloading of trucks or trailers. Has tilt adjuster for eliminating tire cutting, product and equipment damage, and time-wasting maneuvering of equipment. On right is rubber-neoprene bumper.—Kelley Co., Milwaukee. (98D)

2 HANDLERS: Featured are a new stair cart and a magnesium bakery-transfer rack

NEW hand truck rolls up and floats down steps and ramps. Two-wheel brakes permit control for safely descending stairs. Power drive rolls cart step-by-step.—Valley Craft Products, Inc., Lake City, Minn. (98E)

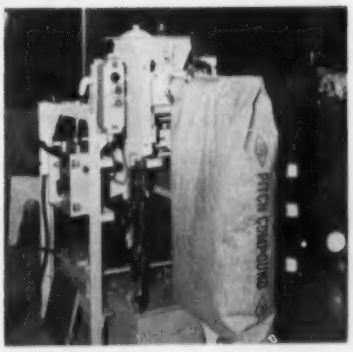


PUSH-AROUND bakery transfer rack is made of sturdy, lightweight magnesium. It's for use in trailers for inter-city delivery of breads on standard trays. Models are available for end or side loading. Large trailers carry about 15 racks. Weight is a low 179 lb. Load capacity of caster-mounted rack is 840 lb. This rack is of natural magnesium finish—waxed and of welded construction. Manufacturer: Brooks & Perkins, Inc., Detroit. (98F)

5 MISCELLANEOUS: Newest in car loading, doors, bagging, carton-strapping, and toting units

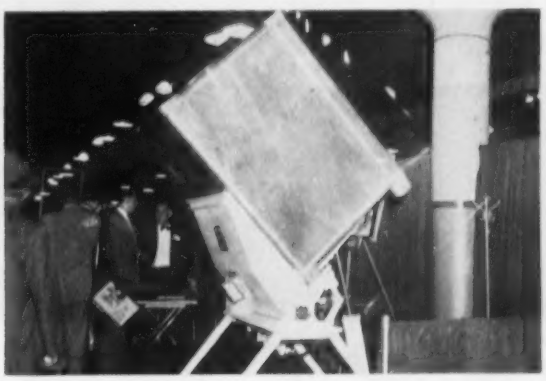
THIS compartmentizer is an adjustable bulkhead device, permanently installed in a box car for safe stowing of lading.—Pullman-Standard Car Mfg. Co., Chicago. (99A)

RUBBER DOOR is flexible, light in weight, and shock-absorbing. Door "gives" when struck. Exterior is reinforced with 2-ply duck.—Stic-Klip Mfg. Co., Cambridge, Mass. (99B)



AUTOMATIC valve-bag packer features electrically-timed bag settler to fit into filling cycle. Agitator-type feed hopper checks bridging.—Black Products Co., Chicago. (99C)

STEEL-BAND STRAPPER handles all sizes and types of cases, cartons, and packages at speed of 18 straps per min. Tension is automatically compensated so maximum reinforcement and protection is afforded every package, irrespective of variation in size. Displayer: General Strapping Corp., New York City. (99D)



BULK-CARRYING Tote Bin for efficient, economical, flexible in-plant storage and handling. Conveying systems transfer material from bulk hopper-cars to bins. Newly announced is special car for shipping the units (no freight payment on bin, and empty deadheaded free).—Tote System, Inc., Beatrice, Neb. (99E)

For More Details, Circle Key Number on Readers' Service Card

HIGHLIGHTS OF HANDLING TALKS . . .

■ **Half of what consumers pay for merchandise goes toward the expense of picking up, moving, and laying down goods in production and distribution.**

So declared D. A. Gillespie, Montreal, at the American Materials Handling Society's conference in connection with the NMH gathering.

He also accented the need for greater strides in materials-handling methods to compensate for ever-increasing demands of leisure through vacations and shorter work-weeks.

■ **Most retail-store delivery trucks, now clogging city traffic, might be removed from the streets if there were wide adoption of the new public distribution warehouse idea.**

This was the view of R. C. Waehner, Lever Brothers, New York City, who said that under the proposed system each manufacturer supplying various outlets in a community would maintain inventories of his products in such centralized warehouses.

Distributing performance of 1 truck from this type station could be rated, he said, at 20,000 lb.—equal to that of 40 vehicles operating for as many manufacturers.

Further, Mr. Waehner challenged labor's concept that automation would reduce employment. The labor force, he pointed out, has increased 100% in the past 50 yr.

■ **Industry should not delay in using presently available handling equipment—despite rapid introduction of new units. For tangible benefits of such improvements, though difficult to evaluate mathematically, can far surpass cost savings.**

Here, the speaker—L. J. Riege, U. S. Gypsum Co., Chicago—went on to say that the improvements actually win more than direct advantages. Also to be accounted, he said, is the fact that the company is thus in a better position to incorporate new units into its system than are firms that have postponed revisions.

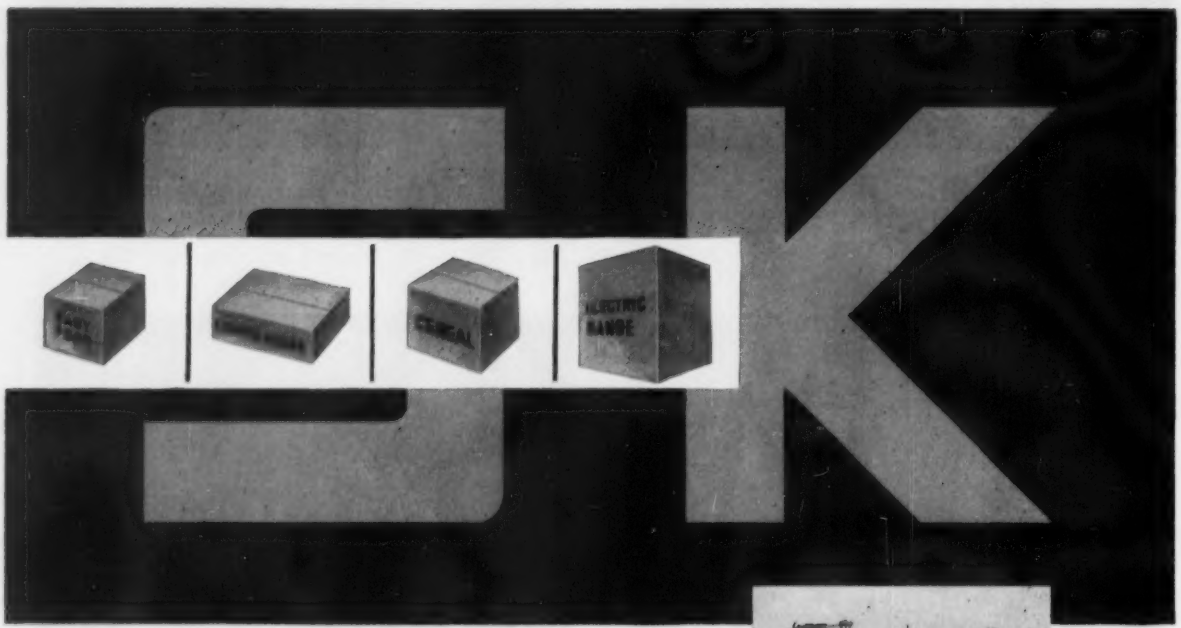
■ **The increase in engineering skills, rather than union leadership, has been responsible for our higher productivity.**

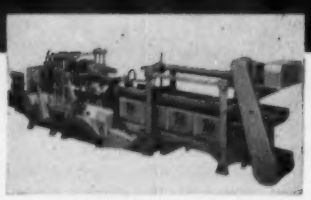
Maker of this point was F. M. Gillies, Acme Steel Co., Riverdale, Ill.

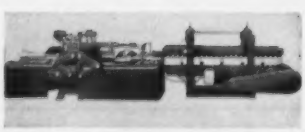
Saying that it was certainly true that manpower is now more productive, he then called for more considered assignment of the proper credit for this progress.

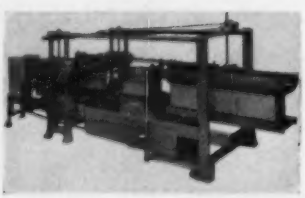
S-K GLUERS and SEALERS

The best way to close ANY shipping case









Standard-Knapp Gluers and Sealers are built to handle any fiber or corrugated shipping case, big or little, long or short. S-K Gluers and Sealers range from hand fed compression units to fully automatic machines that detect and adjust for a variety of case sizes.

With S-K Gluers and Sealers you are assured of strongly bonded, neat, and uniformly squared cases. Gluing is the most economical way to close a case, and remember, glued cases are easy and fast to open.

FOR EFFICIENTLY INTEGRATED operations, use Standard-Knapp Case Packers in combination with Standard-Knapp Gluers and Sealers. S-K packers assure savings on can, bottle, carton, bag or glass container lines.

For complete information on Standard-Knapp Gluers and Sealers write Dept. F. Or ask for your copy of the Emhart Condensed Catalog of over 275 machines.

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DIVISION OF EMHART MFG. CO.

PORTLAND, CONNECTICUT

Advanced Techniques Rocket Output 40%

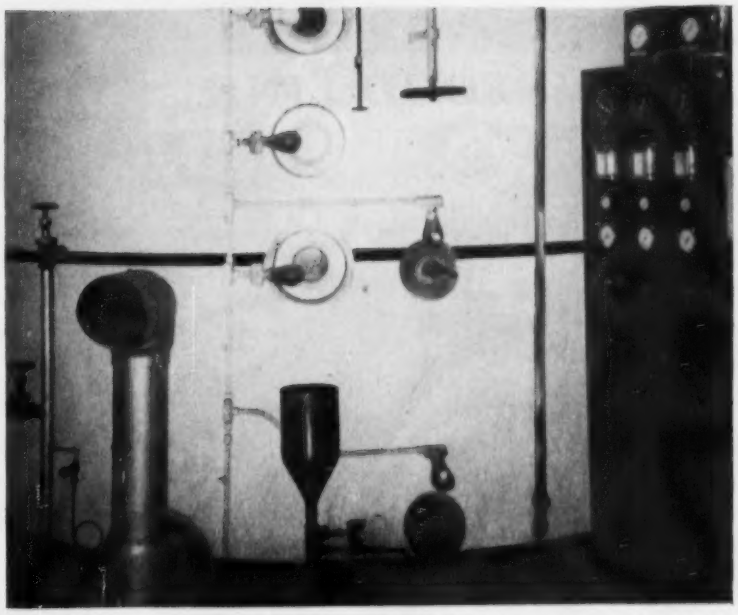
The Amalgamated Sugar Co. ranks fourth among 19 beet sugar producers operating in the U. S.

Company output, during the 1954-55 campaign, was 253,618 tons of refined sugar—14% of the current annual quota allotted domestic cane and beet sugar men.

Production in 1947-48 (record company year) was 5,572,894 bags. It was turned out at six plants in 852.66 factory days. Average daily production was 37,868 bags.

In 1954-55, output was 5,072,366 bags. This was produced by five plants in 525.83 factory days, at a daily average of 45,060 bags.

▶ Thus, five plants produced as much per day in 1954 as seven plants could have produced in 1947. Major credit for this 40% rise goes to design and installation of new, more efficient equipment—such as the high-production vacuum evaporator detailed in this article.



FORCED CIRCULATION VACUUM PAN, designed by Amalgamated engineers, has compact panel (right) for control of all important sugar-process variables. Periscope device (left) is new Sucroscope that gives operator a magnified image of grain size and formation inside pan. Powdered sugar slurry, added to form grain, is introduced into pan through funnel-shaped seeding pot (center).

New Idea Jumps Vac-Pan Output

Product quality also raised as sugar engineers crystallize their circulation concept into a more efficient operation through principle of experiment . . . design . . . build

EDGAR B. COLE

Assistant Chief Engineer, The Amalgamated Sugar Co., Ogden, Utah

Our special notion, at Amalgamated Sugar Co., Ogden, Utah, was that addition of mechanical circulation to the standard beet-sugar boiling unit—the calandria-type vacuum pan—would speed evaporation and thus bring increased production.

And action on this approach was in order. For our engineers calculated that in a plant with huge input volume—running in some cases to more than 4,000 tons of beets per 24-hr. day—even small savings gained through improved energy balance would conserve thousands of dollars over the course of a campaign (a packing season lasting from 90 to 120 days).

The mechanical-circulation vacuum pans that evolved from this basic concept have boosted company production rates to new heights, also gained better quality in the white sugar product. Further, the complete instrumentation with which our latest pans are equipped has eliminated manual operation and thus given signifiant product control advantages.

Experimental Unit Tried

The picture is clarified by tracing the developments from the early experiments:

In 1950, one mechanical circulator was installed in a low-raw calandria, and results were carefully logged.

Sugar boiling was so decidedly improved that we then converted eight more intermediate and low-raw calandria pans the following year (in Oregon and Idaho factories). Strikes (batches) boiled in these units proved the feasibility of producing a satisfactory grade of commercial white sugar by the new forced method.

At this point, it was felt that enough progress had been made to warrant a complete study of vacuum pan design. Experts were consulted and literature was examined—even units of foreign make were considered.

After much deliberation, we reached these five conclusions—

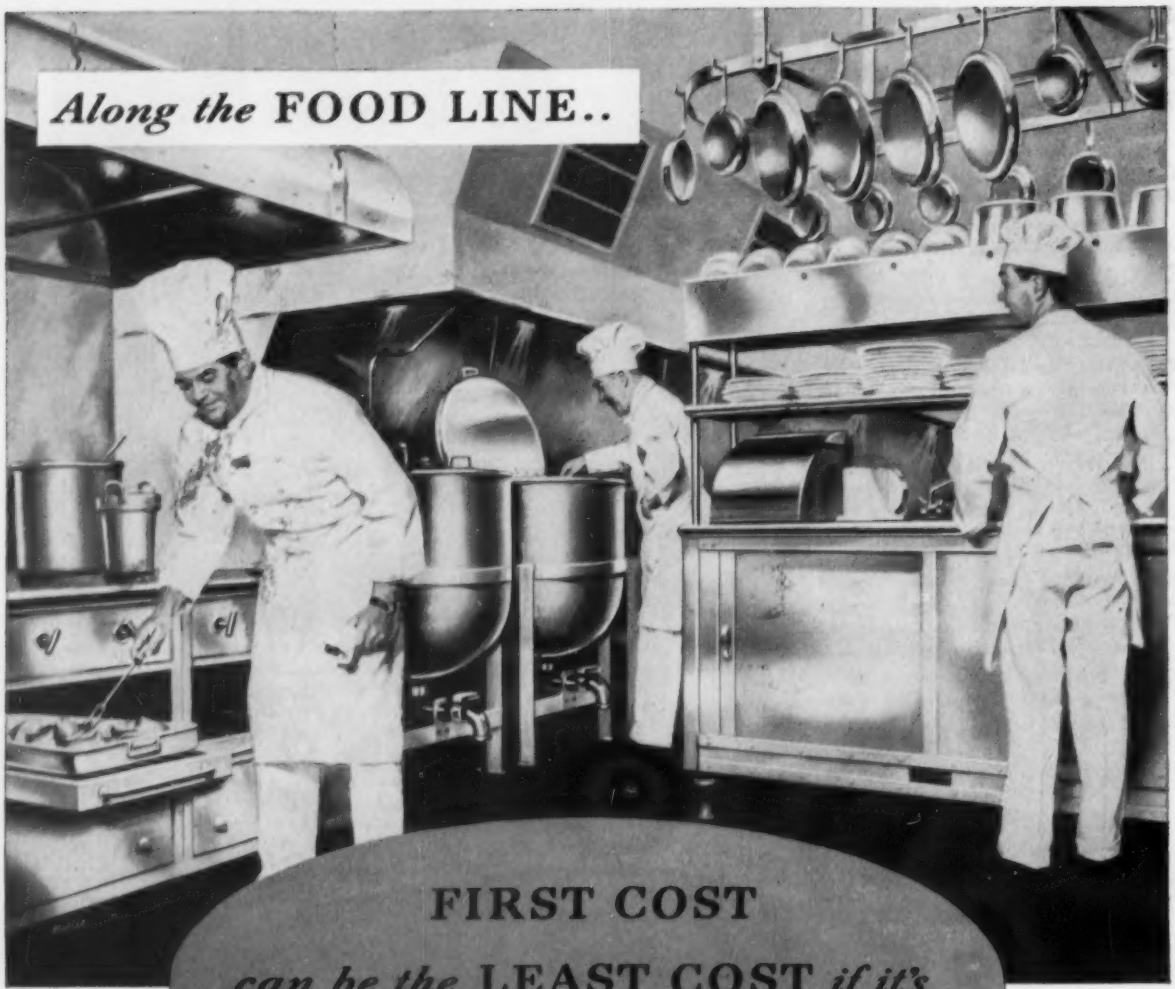
1. Pan design requires a certain compromise, since it's impossible to include all desirable features in one unit.

2. A calandria-type pan offers the best in heating-surface construction.

3. A forced circulation impeller is necessary to maintain an adequate production rate.

4. Pan must have a barometric condenser and a piston-type vacuum pump. Both these units must be large enough to do the job.

5. Complete instrumentation is desirable, but has to be kept compact and



FIRST COST *can be the* LEAST COST *if it's the* LAST COST

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Booklets currently available on the principal uses and methods of handling AL Stainless in the Dairy, Meat and Brewing industries (also Paper, Petroleum, Chemical, Textile, Laundry and Hospital fields). Others in preparation. Write for a copy in the field(s) in which you're interested.

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No material is more at home around food (or beverages, drugs, chemicals, etc.) than AL Stainless Steel. And that's not just because stainless is perennially good-looking, and so easy to keep clean.

Basically, it's because stainless steel equipment is the most economical you can buy. It stands up so much better—lasts so much longer—costs so much less to clean and maintain—that it actually saves you money in the long run. First cost isn't the whole story, you know. It's the long-term, *over-all* cost that counts, and no other material is as hard, strong and resistant to heat, wear and corrosion as stainless steel.

So, when you want equipment that has to look well, maintain high sanitary standards and take a beating every day, remember that only stainless steel can give you the utmost in service and economy. ● Use time-tested AL Stainless, and let us help you work out any design or engineering details. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.***

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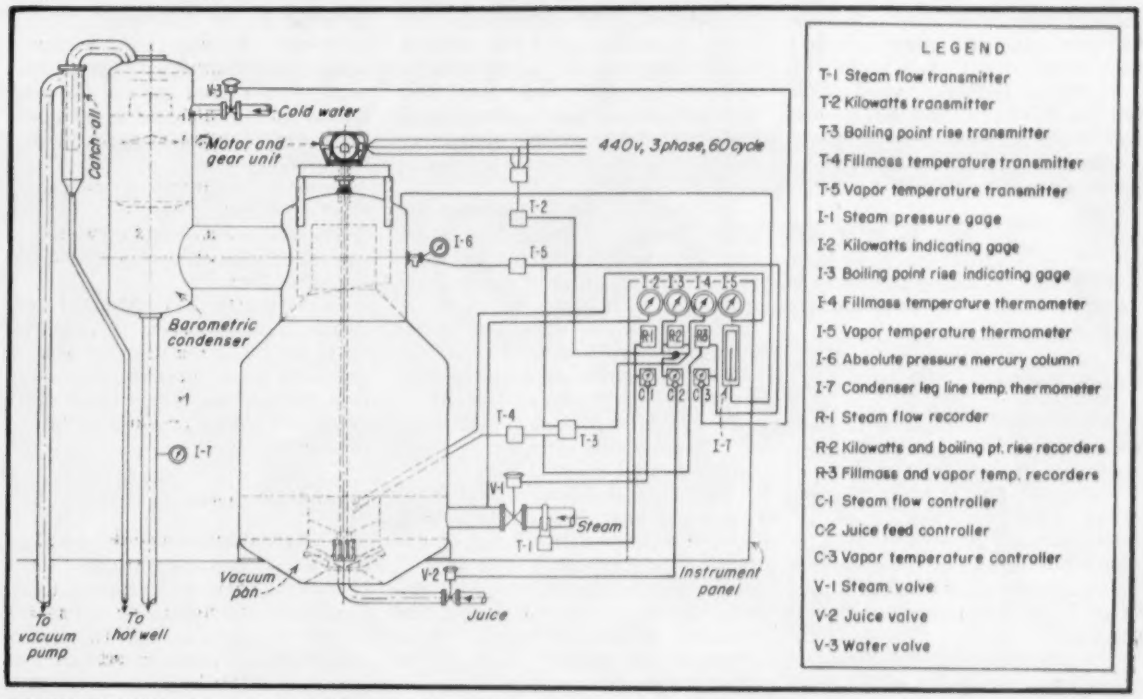


GRAPHIC VIEW of complete instrumentation system is given in this blueprint drawing. Note how grouping of automatic controls—that cover all process variables—cuts operator work.

easy for the machine operator to handle.

From this evaluation, specifications were drawn, and the following empirical rules were developed:

A. Maximum depth of fill over the top tube sheet should not exceed half the diameter of the pan.

B. The pan should contain 2 sq. ft. of heating surface for every cubic foot of strike capacity.

C. Fast, accurate temperature control requires a vacuum pump with capacity of 1 cu. ft. displacement for each cubic foot of strike capacity.

D. During the graining period, a tube circulation rate in excess of 1½ ft./sec. is desirable.

With these proportions established, it was found that the ideal graining charge—25% of the final strike volume—had to be upped to 30%, which is as close as this relationship can be designed.

A study of the literature on forced-circulation impellers* led to design of a new type—along the lines of an axial-flow pump impeller. This has greatly increased pan efficiency.

Experimental Pan Built

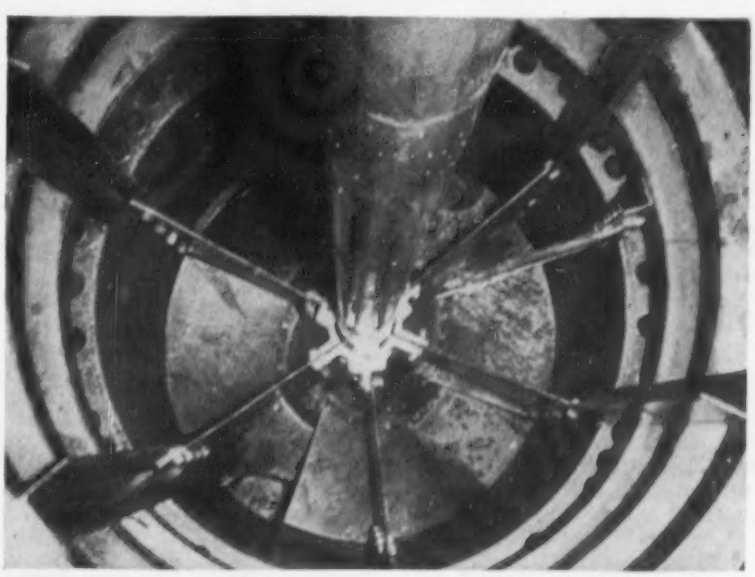
From this extensive information, a pan was built, on the basis of competitive bids. During the test-out period, when the unit was operated on water, it showed an efficiency within 3% of the design-calculated performance.

During the last campaign, at the Rupert, Ida., plant, the new unit operated for 95 days and boiled 756 white strikes, 2 intermediate strikes, and 1 low-raw strike. And results were so successful that two more of the new pans are now under construction.

This will give the company 10 mechanical circulators installed in intermediate and low-raw pans, and 2 in action in white sugar pans.

Each new unit represents a $60,000 investment. Of this amount, $11,000 is spent on the circulator, its gear unit, and drive. The necessary instruments account for $9,000. This $20,000 sum (circulator and instruments) is $3,600 more than the conversion cost of individual units in 1951.

However, these expenditures can be justified by resulting steam economy and superior quality of the sugar thus produced. (*Turn page*)



INSIDE VIEW of vac-pan shows new impeller. Some of calandria tubes are visible around outside edge. Bottom bearing is visible at center.

* Notably, Stepanoff's *Centrifugal and Axial Flow Pumps.*

At our Rupert plant, the new pan demonstrated an ability to maintain high production rates using first-effect vapor at not over 13 psig.

Savings are further increased by the fact that this multi-effect unit requires no more than 20 psig. steam from the power plant exhaust—the same amount formerly used to operate the old-style pans.

The unit produces 12 strikes per day—or about 14,000 cu. ft. of white fillmass in 24 hr. This is equivalent to sugar from 1,800 tons of beets per day.

Quality Improvement

In addition to savings, the new pan has shown it can produce sugar superior to that made in the old coil pan (the only type of white sugar pan at Rupert prior to 1954).

The standard grain size (1954 campaign) was 0.0132 in. mean aperture (this m.a. being a test opening through which 50% of the sugar sample will pass).

To maintain this m.a. standard, the old pan averaged a coefficient of variance in grain size of 32 (the smaller the c.v. number, the more uniform the sugar grains).

With the same m.a., the new forced circulation pan easily achieves a c.v. of 30—and when extra precautions are taken, this figure drops to 28.

However, the standard screen test for m.a. and c.v. is not sensitive enough to determine the real difference in uniformity of grain size between sugars boiled in old and new pans.

To gain this specific proof, a low-power microscope is necessary. Its use reveals that sugar produced in the new unit is very uniform in grain size. Further, it shows an almost complete absence of crystals that would pass through a 100-mesh screen and a low incidence of agglomerates. All grains are of a single structure with no sign of twinning (reversed assemblage of crystals).

A visual comparison of sugar produced in the old and new pans shows that sugar produced the new way has a much higher luster—a difference seen easily by even an untrained observer. Under the microscope, crystals appear to have polished surfaces and smooth, rounded corners.

Another advantage noted is that this sugar "washes up" in the centrifugals with about a quart less water (per machine) than the old product. Also, less dust rises in the dryer from sugar produced by this method.

Contrary to popular opinion, the forced circulation pan is not limited to production of a fine, mixed-grain type of sugar.

For, it can produce any size of grain desired. And within reasonable limits, it can turn out a very uniform grained sugar—or deliberately make a strike of thoroughly mixed sizes. This high-performance pan has been found flexible. Under proper instrument control it can produce almost any results desired.

It is entirely possible that with the whole process utilizing the forced circulation system we can supply sugar to meet specifications of any practical grain size from about 48 up to 24 mesh, with a c.v. acceptable to the average industrial user.

The barometric condenser employed is basically of the Byer's type. However, significant changes in baffle spacing and shape have given this new unit an 8-to-1 range of operation.

Thus, with 5,000 to 40,000 lb. of steam per hour, this condenser will operate with less than a 1 deg. C. difference between vapor and leg-line water temperatures. Here, one imperative requirement is that the vacuum pump be of adequate capacity to remove all non-condensible gasses that enter the condenser.

Compact Instrumentation

There is still considerable work to be done on instrument design. While retaining all desirable features incorporated in the first unit, we wish to simplify installation and cut overall instrument cost. Electronic process control possibly may be the final answer to this problem.

The present instrument setup comprises miniature panel components of the pneumatic type. Several makes are represented. The most effective unit was selected for each job.

Once the complete system was hooked up and calibrated, it went through the entire campaign without an error. However, the burden of synchronizing calibration for the individual instruments was considerable, and every effort is being made to reduce it when future equipment is installed.

In this system, six variables are measured, recorded, and indicated: Steam flow, calandria steam pressure, kilowatt power to the mechanical circulator, boiling point rise, fillmass temperature, and vapor temperature.

Of these variables, the following three are also controlled: Kw. power, boiling point rise, and vapor temperature.

Through use of a two-way selector valve, either kw. power or boiling point rise may be used to control actions of the juice valve. In operation, boiling point rise is used during the first half of the strike. Kw. power operates the control during the last half.

Vapor temperature is kept in line by admission of cold water to the barometric condenser. A mercury-column absolute pressure gage, connected to the vapor space of the pan, acts as master reference in all questions of absolute pressure versus vapor temperature.

However, in actual practice the vapor temperature—measured by the thermometer—has never disagreed with equivalent temperature as read from the mercury gage.

In one installation, additional provision was made to measure depth of fill of magma in the pan, and also to gage head loss or pressure drop due to flow through the tubes. These indicators will not be repeated on future installations.

Control Operation

All the variables are recorded on 30-day strip charts—two records to a chart. Each separate factor is measured by an individual transmitter and passed to the recorders in the form of a calibrated air pressure, proportional to the measured variable.

These air-pressure signals also serve to activate the three remote-type stack controllers. These units are equipped with individual, manual set-point stations, located on the front of the panels.

Should these pneumatic instruments and control valves fail to function, operator can turn to direct indications of calandria steam pressure, fillmass temperature, and absolute pan vapor pressure. Using such data and the manual valves on the feed lines, a satisfactory strike can be produced in an emergency.

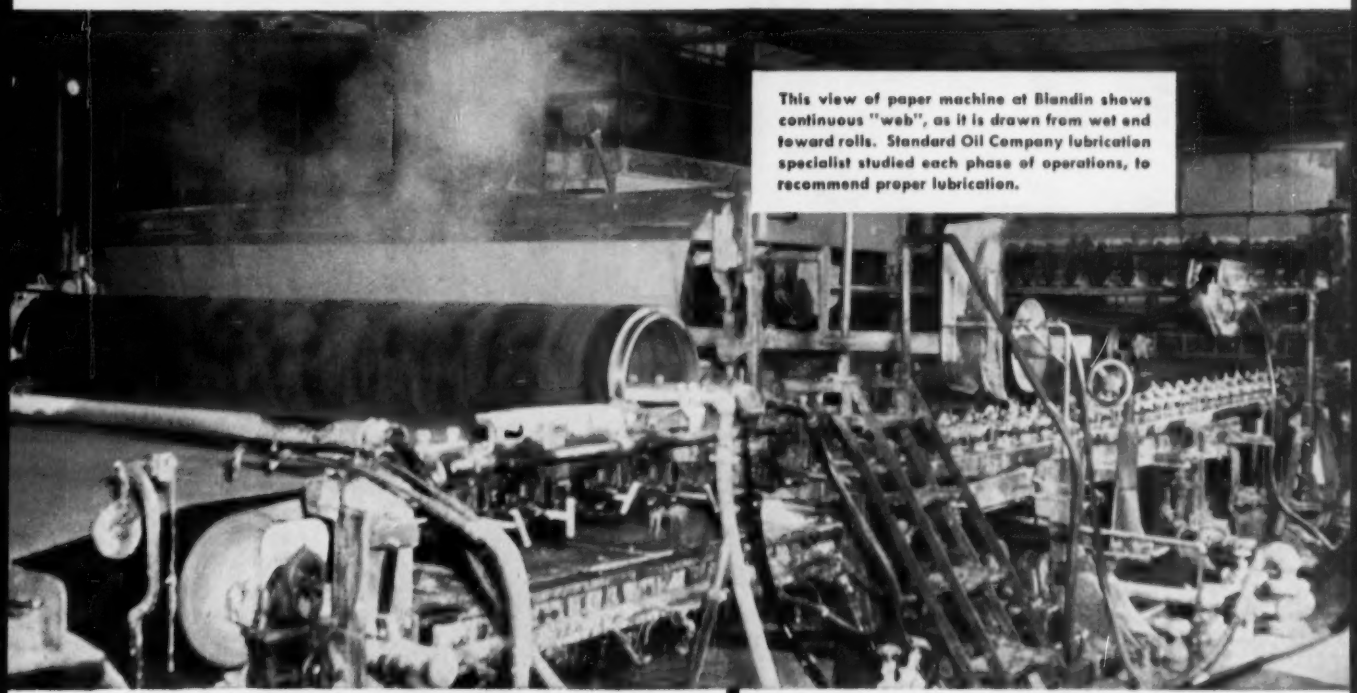
Optical Improvements

An additional instrument used in this system—completely new to sugar boiling in this country—is the Sucroscope. This is a magnifying periscope device.

Located on the pan, it permits the operator to see grain size and formation at a glance from the very moment of seeding up to the end of the strike. And with its 30X magnification giving a very clear image of the sugar crystals, it has proved a valuable addition to the new vacuum pan instrumentation, especially in the white and intermediate sugar operations.

A further aid considered as basic instrumentation is the large-diameter sight glass in the sloping shoulder of the pan. A convenient set of steps and a platform lead to this device. A hot-water wash device is fitted to clean the interior of the glass, thus enabling the machine operator to keep tabs on inside conditions.

STANOLITH GREASE *overcomes trouble spot, keeps paper rolling at* BLANDIN



This view of paper machine at Blandin shows continuous "web", as it is drawn from wet end toward rolls. Standard Oil Company lubrication specialist studied each phase of operations, to recommend proper lubrication.

STANOLITH Grease aided the solving of a rough lubrication problem at Blandin Paper Company in Grand Rapids, Minnesota.

A bottleneck on the paper making machines threatened production at this hustling paper plant four years ago. The trouble occurred near the beginning of the process, where the pulp contains up to 99% water. At this point, bearings are greeted by a shower of water and stock.

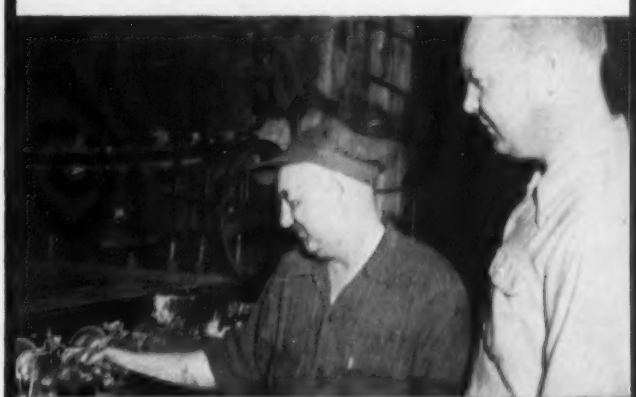
Greases were quickly lost, literally washed away. Bearings were ruined early in life. Not only had greases failed in their duty but they caused paper staining.

A Standard Oil lubrication specialist recommended STANOLITH Grease for use on the wet end of the paper machine. It did such a good job that Blandin maintenance personnel put this multi-purpose grease to work on other applications, too. Now, except when open gear and brick greases are required, STANOLITH serves the entire plant, replacing a wide number of single-duty products.

STANOLITH is truly a multi-purpose grease. It may be used almost anywhere on the job, in mechanical or hand-operated dispensers. STANOLITH Grease is heat and water resistant. It will reduce grease inventories, eliminate waste and prevent costly application errors. Find out more about how STANOLITH Grease can help you do many tough lubrication jobs with just *one grease!* In the Midwest call your nearby Standard Oil lubrication specialist. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Blandin maintenance man, Fred Harwood (left), and I. A. Westerlund, Standard Oil lubrication specialist, inspect a table roll bearing. This is just one of many places in the plant where STANOLITH Grease provides top-efficiency lubrication.

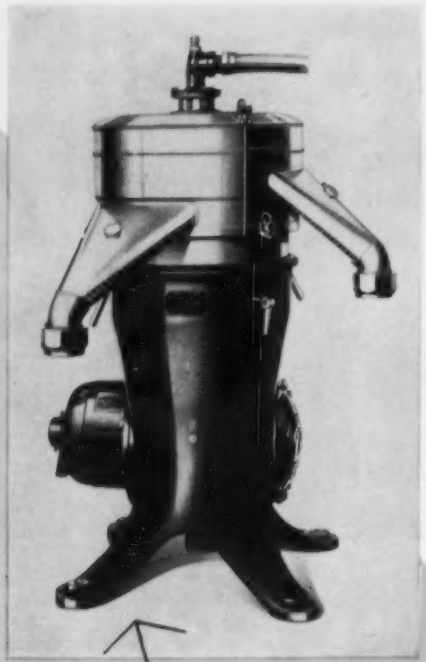
I. A. Westerlund is a graduate of the University of Minnesota with an engineering degree. He is also a graduate of Standard's Sales Engineering School, and makes good use of his training in providing technical service to customers. He's been doing this for 14 years. His customers find this experience and training pay off *for them.*



STANDARD

STANDARD OIL COMPANY (Indiana)

HOW MUCH TOO MUCH IS "STOP-AND-GO" COSTING YOU?



"Stop-and-go" separating by means of filters and settling tanks is costly, time-wasting . . . and *unnecessary*.

De Laval Centrifugals streamline production by making separation, clarification and concentration *continuous* processes.

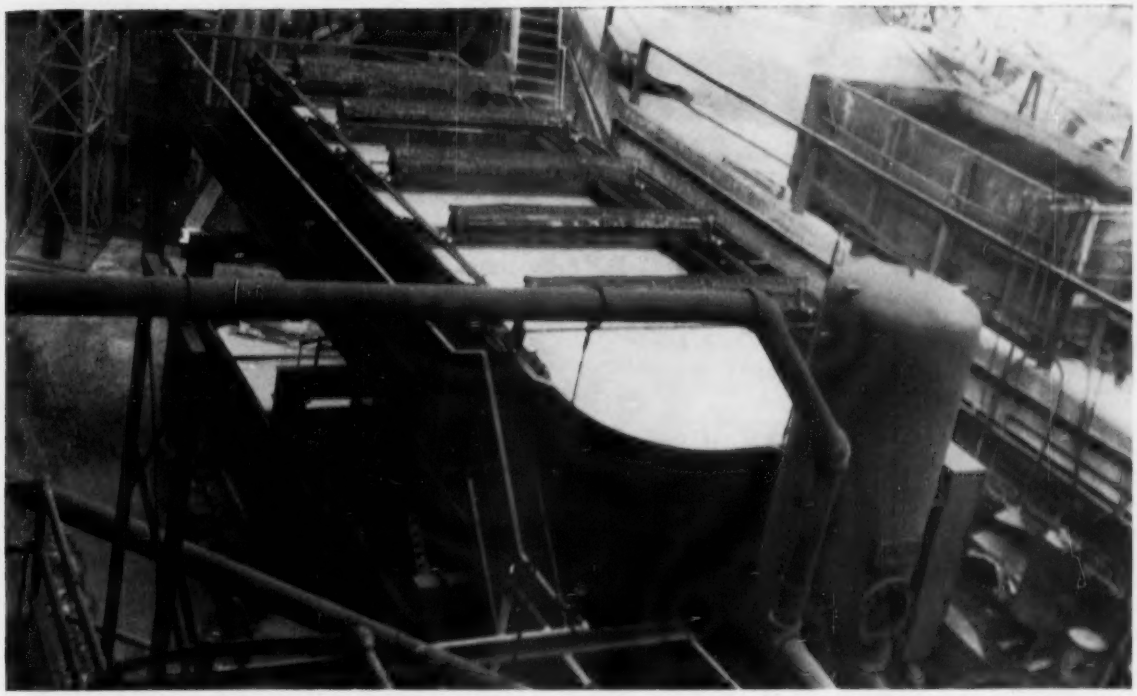
De Laval does in seconds what would otherwise take *minutes* or even *hours* . . . saves *time* . . . saves *money!*

What's equally important, in many processes De Laval Centrifugals also improve the product by doing a *more thorough* job of separation or clarification.

Let us show you exactly what De Laval Separators and Clarifiers can do for you.

DE LAVAL
for faster processing systems

THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • DE LAVAL PACIFIC CO. 201 E. Millbrae Ave., Millbrae, Calif.



SUSPENDED SOLIDS, buoyed to surface by air bubbles suddenly liberated from treated effluent, are skimmed toward collection chamber (rear) by Neoprene-tipped flight scrapers. Waste water enters flotation unit via closed retention tank, where it is aerated at 35 psi. Clarified liquid leaves through bottom tubes.

Air-Flotation Can *Economize* Your Waste-Water Treatment

Wide use seen for efficient system that improves effluent by removing suspended solids . . . Savings cited in major Cincinnati recovery operation

FE STAFF

Removal of suspended solids from waste water by aeration-flotation—a method relatively new to the food industry—offers processors an economical, conserving means for pollution control and byproduct recovery.

The technique is based on the fact that solubility of a gas in a liquid is directly proportional to the absolute pressure on the liquid. At sea level and 70 F., water dissolves about 2% of air by volume. At 15 psi., volume of dissolved air increases to 4%, and is about 6% at 30 psi.

If waste water supersaturated with air and under pressure is suddenly released into an open tank at atmospheric pressure, that volume of air contained above saturation comes out of solution as extremely fine bubbles. These attach to particles of suspended matter in the liquid and carry them to the top, forming a layer of "float" that can be removed by skimming.

Chemicals such as lime and alum may be added before waste water passes through the system. These form a chemical floc which usually aids in removing suspended organic solids.

Experiments reported by W. A. Mercer, National Canners Assn., Berkeley, Calif., indicate the possibility of removing 84% of solids suspended in peach-canning water, and 63% of them from pumpkin wastes.

Although the effluent was comparatively clear and free of visible suspended solids, the process did not greatly reduce the strength of these wastes, nor did use of flocculating chemicals increase effectiveness. Determination of the five-day B. O. D. on treated and untreated samples showed an average reduction of 17% in the case of peach wastes and 7% for pumpkin waste. These results were expected, since soluble solids are responsible for the greater portion of the strength of these wastes.

However, flotation definitely merits consideration where removal of suspended solids is indicated in order to improve acceptability of a cannery waste for a particular final treatment.

Practical Application

The process is already in use in the meat-packing field, to which we now turn for a detailed description:

At E. Kahn's Sons, Inc., Cincinnati

(*Turn to page 228*)

Inventory in 1 Day
And Minus Headaches

Easy Does It With This Simple 12-Point Program

GEORGE J. BEVANS
Systems Consultant, Better Packaging Advisory Council

Everyone from your controller down to your working enumerators will agree that the job of taking physical inventory has traditionally been a tedious, backache-and-headache proposition.

But a new concept has now been demonstrated—showing that you can confine this task to a single day, thus minimizing interference with normal production.

And you can, into the bargain, eliminate the headaches—for this improved approach also assures exact counts and records, while precisely fixing the responsibilities.

It remained for Gene H. Kline, general accountant for General Foods' Carton & Container Division to show us how to do it. He developed an expeditious, yet accurate, system featuring teamwork with double-check tags. This special routine proved most successful in a one-day physical inventory carried out at a GF Mich. plant.

Any food company can apply its twelve simple steps—

1. **First draw diagrams.** Prepare a simple diagram of each inventory-floor area. And make sufficient copies to supply each counting and supervisory team, plus a few extras.

2. **Pick teams, assign areas.** Divide your available manpower into two-man teams, using an assignment sheet to show areas each team will count. Arrange for each area to be covered twice—by different teams.

3. **Select "super" teams.** Designate a separate team (generally, section foreman and an accountant) to supervise counting in each area.

4. **Standardize procedure.** List all items, then give instructions as to how each class of material is to be recorded—by gross, barrels, etc.

5. **Provide tags.** Obtain a sufficient supply of the system tags (upper illustration) to record each different item in every inventory area. (Note that tags are numbered in sequence.)

6. **Give them to "super" teams.** Assign enough of these tags to supervisor teams to cover the areas under their direction. Record these tag assignments by number on an inventory tag control schedule (lower illustration). Strictly account for each tag, to eliminate chances of later confusion.

7. **Write instructions.** Have all special directions on inventory procedure "down in black and white" for the guidance of supervisors.

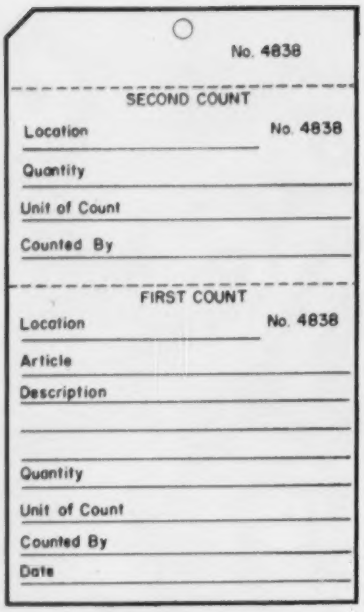
8. **Brief the supervisors.** Hold a meeting of all supervisors, and clarify the instructions word for word.

9. **Inform team members.** Direct supervisors to instruct their team workers on the counting rules. (In smaller companies, supervisor-briefing and team-informing sessions can be run as one.)

10. **Go into action early.** Begin actual counting as soon as possible on the selected day, thus allowing plenty of time for rechecking and accounting.

11. **Follow this system:** Have the first team to cover an area: (a) attach a tag to each pile or bin to be tabulated, (b) make the count and fill out lower (First Count) portion of tag, and (c) tear off this section and turn it in to the supervisory team. Next have the second team go in, make its count, and turn in the mid-portion (Second Count section) of the tag. Then have the "super" team pair-off the tag sections, making sure tag numbers of both counting teams match.

12. **And check this way:** Have the accountant of the supervisory team go over the figures of the paired tag stubs, and then see that any differences found are reconciled. (No erasures should be made; any figures not pertinent may be deleted by drawing a line through them.) Accountant should now identify the goods by symbols, thus classifying them into raw materials, semi-finished, and finish goods. Next, make sure any figure adjustments necessary are made on the First Count stubs, since these contain the complete data. Finally, have all cards turned in to central accounting.



▲The Tag

▼And the Control

INVENTORY TAG CONTROL SCHEDULE

Prepared By _____ Date _____

BUILDING	INVENTORY LOCATION NUMBER	ASSIGNED FOREMAN	ASSIGNED ACCOUNTANT	PRE-NUMBERED INVENTORY TAGS CHARGED OUT	NUMBER OF TAGS CHARGES OUT	TAGS RET'D SPOILED OR VOIDED	SIGNATURE OF ACCOUNTANT RECEIVING TAGS
C&C Basement	B-1	Smith	Fletcher	001-075	75		
	B-2	Black	Fletcher	076-150	75		
C&C 1st Floor	P R	Parker	Martin	151-300	150		
C&C Warehouse	W-1	Burns	Hogan	801-900	100		
No. 2 Warehouse	A-1	Mapes	Long	901-1050	150		
York (Skids & Drums)		White	Long	1051-1100	50		

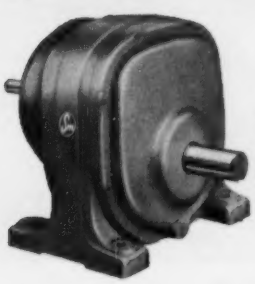
FOR GREATER FLEXIBILITY IN DESIGN MFR. CHOOSES

STERLING SLO-SPEED!

Slo-Speeds' universal mounting features permit flexibility in conveyor design to meet requirements for space, inclines, declines, etc.; the efficient motor and rugged gear system assures dependable, efficient operation and minimum maintenance; the low output shaft minimizes stresses on equipment; the streamlined design is easy to keep clean and improves the appearance of our equipment, reports Francis Curtis, Assistant Chief Engineer, Packing Equipment Div., Food Machinery & Chemical Corp.

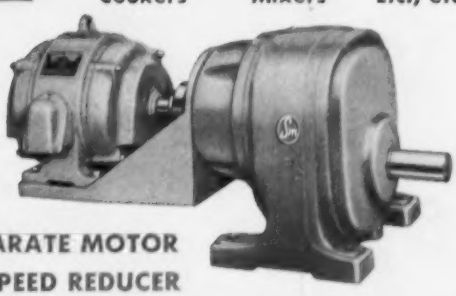
STERLING SLO-SPEED GIVES YOU THE ONE BEST LOW SPEED AND gives uninterrupted service—carries heavy overhung loads—provides versatile mounting and flexibility in arrangement of machinery—saves valuable space—provides greater safety—costs less to install and use. An indispensable source of low speed power for:

Agitators	**Dryers**	**Presses**
Blenders	**Feeders**	**Pumps**
Blowers	**Kilns**	**Screens**
Conveyors	**Mills**	**Tumblers**
Cookers	**Mixers**	**Etc., etc.**



MULTI-MOUNT REDUCER

Available with feet or footless, face or flange mounted.



SEPARATE MOTOR SLO-SPEED REDUCER

For applications where separate motor reducer combinations are desirable.

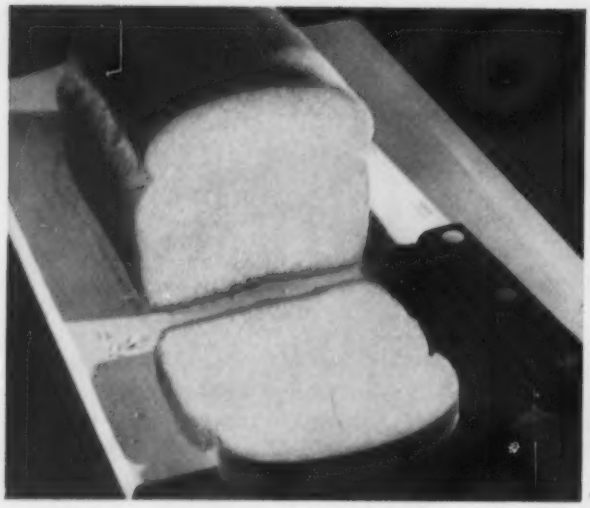
WRITE FOR Application Bulletin showing how Sterling Electric Power Drives increase production efficiency and reduce costs. Ask for Bulletin No. 201-A

STERLING ELECTRIC MOTORS

Plants: New York City 51; Chicago 35; Los Angeles 22; Hamilton, Canada; Santiago, Chile

Offices and distributors in all principal cities

For more information, use coupon on last page.



Sugar is the key to wheat flavor in bread. And of the basic sugars that nature provides, many bakers have discovered that Cerelose brand dextrose—the sugar made from corn—produces more of the finer flavor overtones in baked bread than any other sugar.

Preserving the piquant flavor of tomato products, Cerelose brand dextrose is a reducing sugar that will not mask delicate spice flavors with sweetness. Also, by retarding oxidation, Cerelose increases the shelf life of the natural red tomato color.

To boost flavor...without over-sweetness... more and more food processors are using

CERELOSE®
BRAND DEXTROSE

THE SPECIAL SUGAR THAT DOES SPECIAL THINGS FOR FLAVOR IN FOODS

All too frequently, true fruit flavor is masked by the sweeteners in the preserving syrup. When syrup concentrations must be increased to prevent bacterial spoilage and retain the fruit's fine texture, Cerelose brand dextrose sugar is used to protect the flavor . . . without over-sweetness.

Cerelose brand dextrose sugar is more than just a sweetener here. It accentuates the presence of butterfat to produce the kind of richness Americans like in ice cream. Also, in sherbets and ices, Cerelose allows the manufacturer to increase body without increasing sweetness.

Our technical staff welcomes the opportunity to show you why you should use Cerelose brand dextrose sugar in your formula. Call us today.

CORN PRODUCTS REFINING COMPANY
17 Battery Place, New York 4, N. Y.

Reefer Tanks Keep Fish Fresh, Cut Weight Loss

At sea, new mechanical protecting units enable longer, more distant salmon runs. Ashore they eliminate cannery overtime

RAY BLOOMBERG
Special "Food Engineering" Correspondent, Seattle

The Alaskan salmon operators are now taking a leaf from the tuna man's book on quality.

In short, salmon canners are turning to the use of refrigerated sea water to keep fish fresh and avoid weight loss, before canning.

Two companies have constructed special barges, each equipped with two 7x14x16 ft. steel tanks. Each tank will take 70,000 lb. of fish, cushioned and refrigerated by sea water.

Another firm has a 74 ft. steel ship incorporating tanks of similar size. And two others have installed shore tanks of 70,000-lb. capacity.

Sea water of 55 deg. F. is chilled to 30 deg. F. by pumping, at 850 gpm, through a serpentine brine raceway chiller and thence into the tanks. It requires about 12 hr. to reduce temperature of the tank water to 30 deg. F. Water is recirculated through the cooler six times an hour to maintain this temperature.

Some barges are equipped with fish-elevators. Fishermen have only to load their fish into these and they are automatically elevated, then chuted into the tanks.

Chilled and Safeguarded

"A freshly caught salmon, at 70 deg. F., can be chilled to 30 deg. F. within 30 hr., and in the interim, its quality is protected by the chilled sea water", said E. B. Genuing, Refrigeration Engineering Co., Seattle, who installed the refrigeration units.

▶ **One packing company figures use of the refrigerated tanks conserves at least one-half fish per case of canned finished product—an estimated saving of about 62¢ per case.**

Tanks, which are covered, have two "chimneys" through which fish are dropped and which also relieve side-pressure on tanks due to interior water motion when the barges are at sea. Insulation (2 in.) protects sides and bottoms of each tank.

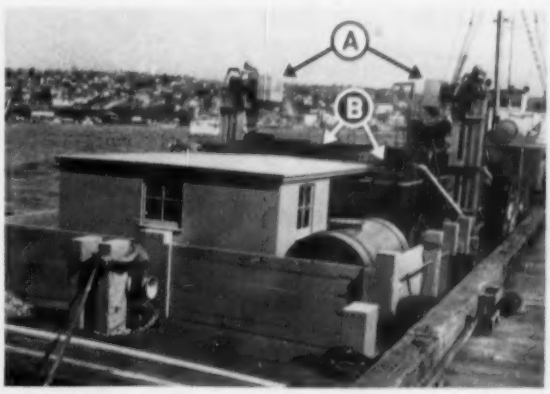
Better Quality

Towed to the fishing grounds to take on salmon from the fishing boats, the barges permit operations in areas

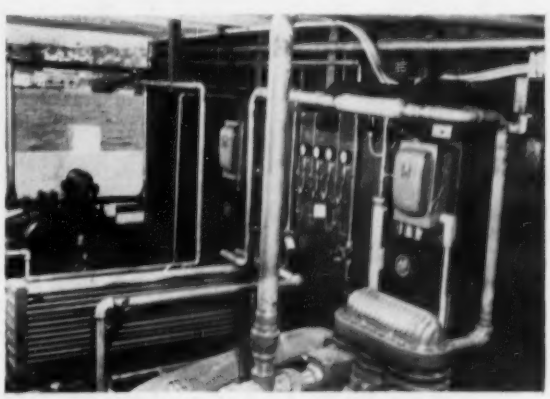
(*Turn to page* 159)

New-Chiller Closeups

ONTO BARGE go tanks for safeguarding salmon quality at sea by ocean-water refrigeration. Fish go in via two "chimneys" (seen atop installed tank at right).



FISHING BOATS need only tie to the barge and dump their catches into bases of handy elevators (A), which raise salmon and chute them into tanks (B).



REFRIGERATION (about 18 tons) is supplied by two compressors (York). One of these units is powered by a 15-hp. motor, the other by a 7½-hp. motor.

Three FOR YOUR MONEY...

WITH *VORTEX* PROCESSORS

no chains... no cams

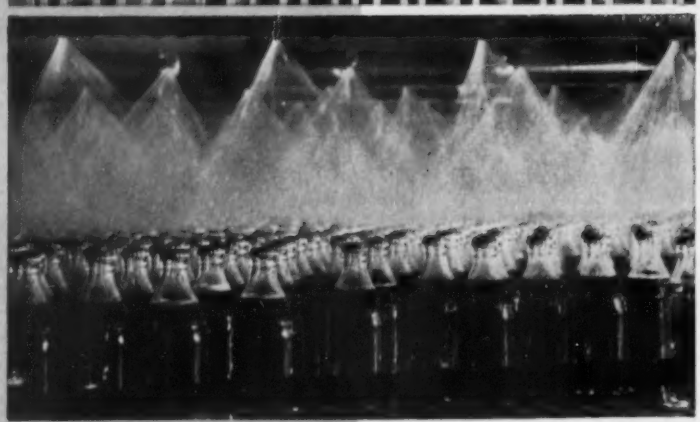
With the Simple Trouble-Free Hydraulic Drive

processing on the "beam"

With the Temperature-Saving, Unique "Walking Beam" Conveyor

drenched with temperature

With the Heat Transfer Efficiency of the "Atomized" Spray System



you get all three...

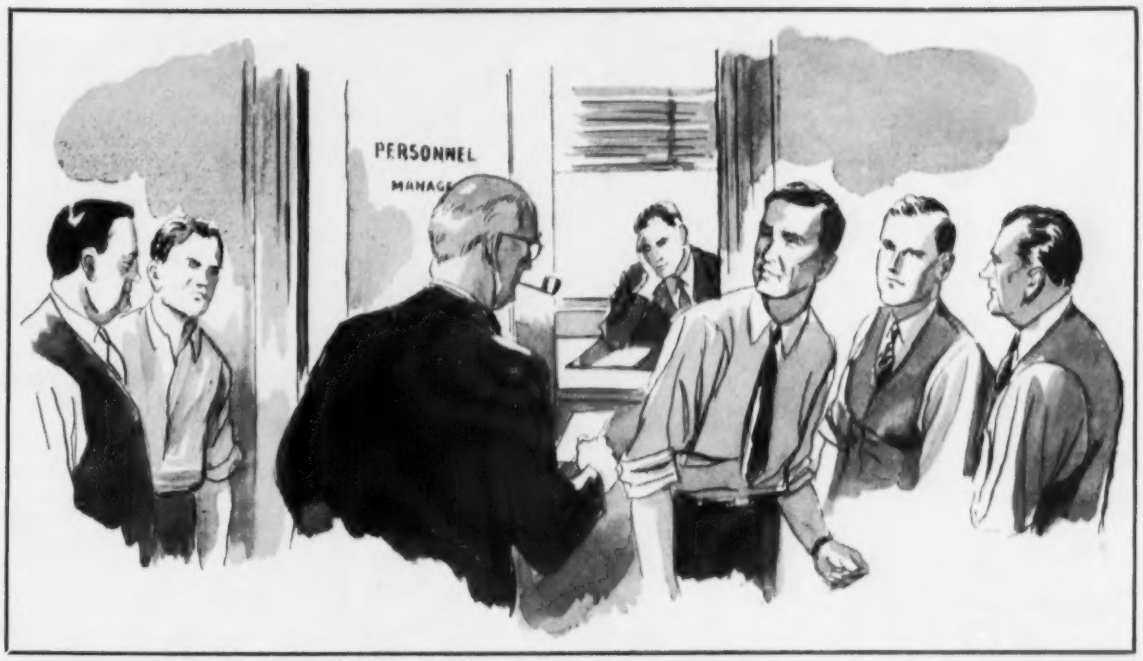
And Assure the Uniform Quality of Your Product With the Versatile

B-W VORTEX PROCESSOR

339

BARRY-WEHMILLER MACHINERY CO.

4600 West Florissant Avenue • Saint Louis 15, Missouri



Ole Sage knew that something was wrong . . .

Ole Sage Episode

BIG "BUT" TO HEED BEFORE SAYING, "FIRE HIM!"

Like Y & G's Nick, your offending worker may justify discharge on several solid counts. BUT—are you targeting the right one at the right time?

IVAN C. MILLER
Associate Editor, "Food Engineering"

The moment he set foot in the personnel department of Y & G Specialty Foods Co., Ole Sage knew that something was wrong.

Several foremen were clustered in the area. As he approached, they halted their conversation and stepped aside, opening his way to the inner office of Tom Watson, personnel manager.

"Well, I suppose you heard what happened," Tom remarked after Ole's greeting. "It never takes long for the news to get around when someone pulls a boner."

Ole eased his way into a chair near Tom's desk before he answered, "As a matter of fact, I *don't know* what happened. But it's plain to see whose nose was caught in the wringer. Suppose you tell me all about it."

"To put it quick," said Tom, "we're hassled over Nick, the fellow in the casing department. You know who he is—the one who always gets drunk right after he's been paid and almost never comes in the next day."

At Ole's nod, Tom continued: "About a month ago we got fed up with it and did what we should have done long ago—fired him.

"But then the union came in and gave us a sob story about his family, a lot of kids, expenses—and all of that. And you know how that goes. We softened up and gave him one more chance.

"But did we get a concession: The business agent agreed that if it ever happened again we could fire him 'for sure' and they wouldn't complain about it."

"And I suppose," mused Ole, "that Nick was out drunk again?"

"That's sure enough what we *thought*," complained Tom. "And that's why we're in a jam. You see, last Thursday was payday and Nick didn't show up on Friday. Naturally, Bill Farrell, Nick's foreman, thought it was the same old story."

Tom paused to light up, then continued: "Bill sent Nick a telegram telling him that he was fired. The only trouble was that this time Nick had a good excuse. The union grievance committee was in here about a half hour ago with the full story—about Nick's wife taking sick during the night, Nick having to get a doctor, having to see the kids off to school, order prescriptions filled, and look after his wife until his sister-in-law could take over."

"Why didn't he call up here," asked Ole, "and let Bill or you know what had happened?"

(*Turn page*)

Meet Ole Sage . . .

Up the hard way came Ole, our principal character in this special series of "cases" fictionized to pinpoint boss-worker problems in the 1955 food plant.

Ole began as a laborer, proved himself "a good worker" who "used his head"—thus won the respect of both workers and bosses. He later rose to foreman, then superintendent. And finally he was management's choice as "a natural" to head Industrial Relations, a job he carried out with unusual success until his retirement.

—Actually, his was a very short retirement. Because his old company, and others, too, quickly were calling on him for counsel—as related in these episodes.—*The Editors*

"That angle is about the only one in our favor," answered the personnel manager. "Nick's story is that he hasn't got a phone in the house and before he was able to get out to one he had received Bill's telegram. Whether or not that's the truth doesn't make much difference because he called the union instead."

"Is there any chance that Nick 'cooked' all this up?" Ole wondered.

"I'm afraid not. The union brought in a statement from the doctor and the labels on the medicine bottles show the right date.

"So," went on Tom, "it looks like we're stuck with a bad one. And that's not the worst of it. Suddenly there's a lot of sympathy built up for Nick among the workers and with it a lot of resentment against Bill Farrell and the company."

Ole puffed thoughtfully on his pipe. "I'm afraid you are on a spot. There may be no help for it short of taking Nick back. Why didn't you back down when the grievance committee brought in the facts?"

Tom looked a bit sheepish, but grinned nevertheless. "Well, I'll tell you. I really had an impulse to do just that. This was our mistake and I felt a little sorry for Nick having all that trouble—and what's more I have to admit he's been behaving himself this past month.

"But in spite of all that, Ole, I didn't want to make things look bad for Tom Farrell. He's a level-headed foreman. And usually he's sure of his facts before he makes a move.

"Of course, he should have checked with me before going off the deep end. However, I'm not sure I wouldn't have made the same mistake, since the situation looked typical, with Nick staying out right after payday."

"I gather," said Ole, "that since you didn't agree to take Nick back the case will go to arbitration. And I've got a feeling you'll lose. Seems to me that there is only one break you can hope for—the possibility that the arbitrator recognizes the extenuating circumstances, and that accordingly, if he reinstates Nick, he does so without ordering the company to make good all of the back pay."

"Called the Shot"

The union did file a demand for arbitration in accordance with the contract. Then Watson and the union's business agent selected an arbitrator. And since back pay might be involved, an early date was requested for the hearings.

By the time Ole Sage dropped in for his next monthly visit, the arbitrator's award was on Watson's desk.

"Well, you called the shot on this arbitration all right," Tom conceded. "Nick was reinstated, and what's more he got back pay for all the time he lost—except one week.

"That loss of a week's pay was for failing to call in to report his absence. The arbitrator believed Nick could've managed a phone call in time to prevent this rhubarb."

"Funny thing about arbitrations," Tom continued. "We could have fired Nick the last time he was drunk—and it would have stood up. And we could have fired him for excessive absenteeism after his last time out, even when caused by his wife's illness—and that would have stood up, too. But, when we dropped him on the charge of being drunk, our case stood or fell on whether or not we could prove he was drunk."

"It's not so funny after all," reflected Ole. "Isn't that what also happens in court? A man might be guilty of any number of things that call for a jail sentence. But if he's indicted for one thing he has to be proved guilty of that or he goes free. His guilt in any other respect is irrelevant.

"Sure," he concluded, "It's a costly lesson. But I hope Farrell learned it well. It never pays to do things impulsively."

Ole tactfully hadn't brought up anything about the way Tom had handled the matter. But he didn't have to. Tom acknowledged his own error:

"You know," he said as Ole rose to leave, "I shouldn't have let this go to arbitration. That was a real mistake on my part. It would have cost us much less if I had given in and settled as soon as I saw we were wrong."

Editor's Note: The settlement quoted in this episode is taken from an actual parallel case that was weighed under the rules of American Arbitration Assn. Fictional names have been used here for the company and workers involved.

Particularly, readers should not infer that other arbitrators would reach the same decisions in cases apparently similar to those recounted in these episodes, since circumstances differ widely, thus altering the factors.

Rather than being based on precedent, decisions derive from specific case history, contract points, and pertinent evidence.

From Ole's Notebook

CLIPPINGS & COMMENTS

The Aim's the Same

By whatever means necessary, management must convince employees that their best personal interest and that of management coincide over the long range.

Once the average worker knows and believes that management's long-range objectives are for the most part imperative if the employee is to obtain the goal that he is seeking, and once he believes that management is trying diligently to see that each individual employee is fairly treated, then there can be no serious trouble between labor and management.—*American Management Assn. "Conference News"*

Agreeing a Bit At a Time

A long while ago, our company engaged each year in the traditional type of labor-management negotiation meetings—as a great many companies still do. These sessions went like this—

Union: "We want 10¢ an hour more."

Management: "We can't do it."
Union: "Yes you can."
Management: "No we can't."
Union: "You can, too."
Management: "We can't, either."
Union: "The heck you say."
Management: "The heck we don't say."

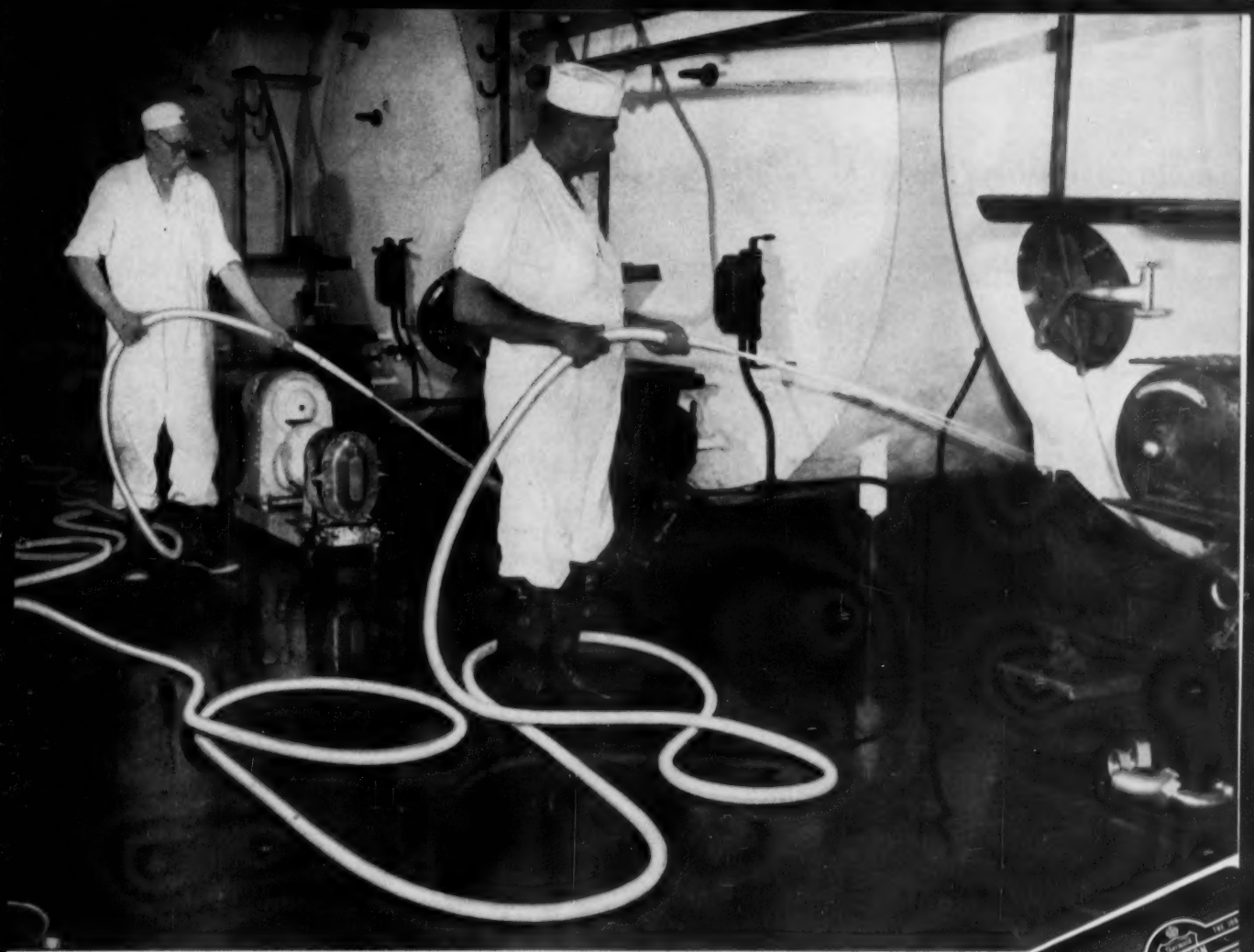
Now, instead of putting on this kind of show once each year, we work at it each month in our regular labor-management meetings.

The minutes of these meetings are called *Memoranda of Understanding*, and after 10 months they become the basis of the next annual agreement, which is worked out finally in the meetings of the last two months.

In effect, we write a 12-chapter book in single monthly installments.

Interpretations of agreement clauses

(*Turn to page 119*)



Thermoid Hose designed specifically for use in food processing plants

Thermoid designs and manufactures many types of hose for a wide variety of specific industrial applications. These 3 are ideal for use in food and beverage plants:

VERSICON most versatile hose ever developed. Handles air, water, oil, gasoline, dilute acids and gases.

CREAMERY for use with hot or cold water and low pressure steam, for cleaning and sterilizing.

BREWERS for use in breweries, wineries and food plants. Imparts no taste or odor.

Your Thermoid Distributor carries a full line of Thermoid Hose, Conveyor Belting and Multi-V Belts to meet your most exacting requirements. He maintains complete stocks and can give you fast service. If you prefer, write direct.

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F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

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Rubber Sheet Packings • Molded Products
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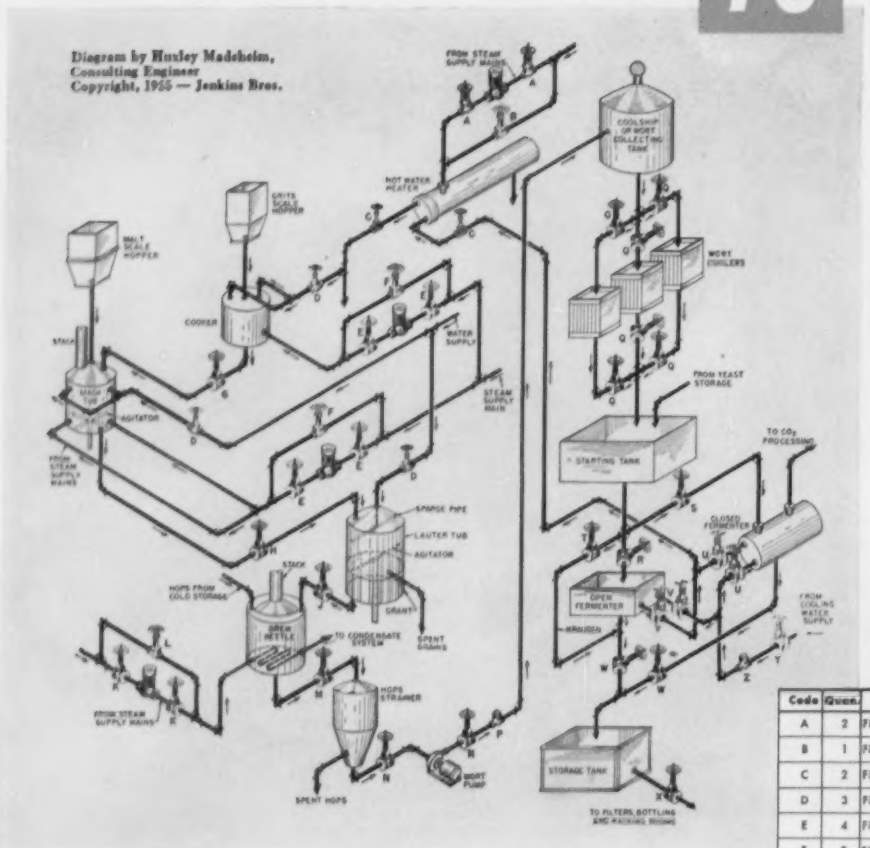
JENKINS PRACTICAL PIPING LAYOUTS

76



How to plan piping connections for a GRAVITY-FEED MULTIPLE-STORY BREWERY

This piping layout is typical of installations in many breweries designed for gravity-feed processing, and the principal operations are briefly outlined.

Corn grits are cooked with water in the cooker, with enough added malt to convert and liquefy the grits. When the malt, which has been mixed with water in the mash tub, is properly steeped, the finished cook is dropped into it and the resulting mash thoroughly mixed.

Pumped into the Lauter tub, the mash grains settle to form a filter bed, from the bottom of which the clear liquid containing fermentable and unfermentable sugars is drawn. Extraction is increased by "sparging" with hot-water spray. This liquid, the "wort", flows by gravity to the brew kettle.

In the brew kettle, the wort is boiled with hops to add flavor and to clarify and preserve it. The hops are then strained off, and the liquid is pumped to the "coolship" tank to settle. It then goes through coolers to reclaim most of the residual heat, and on to the starting tank.

In the starting tank, the yeast is added, and the mixture flows to the fermenters, some of which are closed to collect the carbon dioxide gas for future use. After fermentation, the beer is cooled again and sent to storage tanks for eventual bottling and racking.

Consultation with accredited piping engineers and contractors, experienced in brewery design, is recommended when planning any phase of the various processing systems.

To simplify planning, select all the valves you need from the complete Jenkins line. It's your best assurance of *lowest cost in the long run.* Jenkins Bros., 100 Park Ave., New York 17.

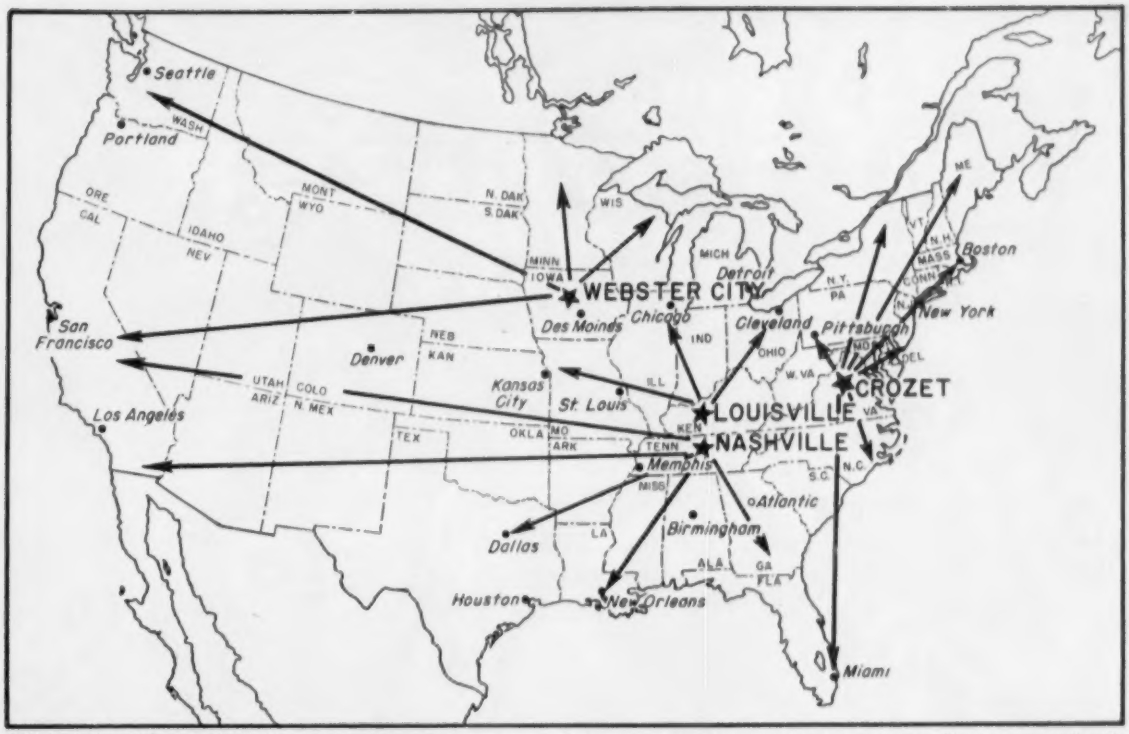
Complete description and enlarged diagram of this layout free on request. Includes additional detailed information.

VALVE RECOMMENDATIONS
For details of valves to suit varying conditions see Jenkins Catalog.

Code	Quan.	Jenkins Valve	Service
A	2	Fig. 275 Bronze Gate	Shutoff steam to heater
B	1	Fig. 556-P Bronze Globe	Bypass to heater
C	2	Fig. 47 Bronze Gate	Shutoff water heater
D	3	Fig. 106-A Bronze Globe	Continuous water flow
E	4	Fig. 204 I.B. Gate	Process steam shutoff
F	2	Fig. 576-P Bronze Globe	Bypass water valve
G	1	Fig. 677-A Bronze Gate	Shutoff cooker (wash)
H	1	Fig. 677-A Bronze Gate	Shutoff finished mash
J	1	Fig. 677-A Bronze Gate	Shutoff wort to kettle
K	2	Fig. 204 I.B. Gate	Shutoff steam to kettle
L	1	Fig. 576-P Bronze Globe	Bypass to kettle
M	1	Fig. 677-A Bronze Gate	Shutoff wort line
N	2	Fig. 677-A Bronze Gate	Pump shutoff
P	1	Fig. 352 Bronze Swing Check	Prevent backflow
Q	6	Fig. 677-A Bronze Gate	Shutoff coolers
R	1	Fig. 677-A Bronze Gate	Shutoff open fermenter
S	1	Fig. 677-A Bronze Gate	Shutoff closed fermenter
T	2	Fig. 677-A Bronze Gate	Krausen line
U	2	Fig. 675-A Bronze Gate	Water to closed fermenter
V	2	Fig. 675-A Bronze Gate	Water to open fermenter
W	2	Fig. 677-A Bronze Gate	Shutoff storage
X	1	Fig. 677-A Bronze Gate	Shutoff rack & bottling
Y	1	Fig. 675-A Bronze Gate	Shutoff well water
Z	1	Fig. 352 Bronze Swing Check	Prevent backflow

JENKINS VALVES
LOOK FOR THE JENKINS DIAMOND
SINCE 1864 JENKINS

SOLD THROUGH PLUMBING-HEATING AND INDUSTRIAL DISTRIBUTORS



NATIONAL DISTRIBUTION of Morton products is shown by arrows. Gasoline-powered tractors handle eastern and midwest routes, while diesels are used for longer and rougher hauls to west coast.

Solves "Big-Spread" Problems With Own Tractor-Trailer Fleet

Nation-spanning task force of 43 units delivers frozen pies, backhauls raw materials to boost transport economies and performance

A COMPANY-OWNED FLEET of highway tractors and refrigerated trailers has proved the answer to Morton Packing Co.'s particular problem of gaining assured efficiency and economy in its national distribution of frozen meat and fruit pies.

Four plants produce the Morton products: Louisville (serving Chicago and the central midwest); Webster City, Iowa (covering northern midwest); Crozet, Va. (for the east); and Nashville (distributing to the southwest and south).

The great distances covered, plus the need for constant temperatures of −5 to −10 deg. F., set up a difficult problem.

Rail shipment was not considered the answer. The company tried this and found that its need for refrigerated cars made it too expensive.

Explored next were common and contract carriers. But for Morton's "picture" the costs were still considered too high, and the problems of contracts and schedules were felt by management to be drawbacks.

The decision to install a company fleet followed calculation by the executives of these three advantages:

1. Freight costs would be lowered.

2. There would be more flexibility in shipping.

3. A saving on incoming raw materials could be realized through company-truck return hauls of raw materials.

In June, 1954, Morton bought five tractor-trailer units for deliveries to specific points that would "double" as pick-up stations for raw materials. Trucks were to carry back ingredients, cartons, labels, and even machinery.

The initial operation proved so successful that Morton now maintains its own fleet of 43 tractor trailer units.

The loads carried are limited to the gross vehicle weights allowable in the various states. However, they average 3,000 cases of 8½-oz. meat pies (packed 1 or 2 doz. to the carton), or 1,400 cases of 10½- or 24-oz. fruit pies (packed 1 doz to the carton). On combination loads, total weights, rather than case quantities, determine number of cartons handled.

Carrying only company goods, the fleet is free of all I. C. C. regulations, save those concerning safety

STURTEVANT
MICRONIZER*
GRINDING MACHINE

Grinds Materials To Any Micron Size Specification

NOW AVAILABLE FOR OUTRIGHT SALE

24" Size
Capacities 1000 to 1200 lbs. per hour

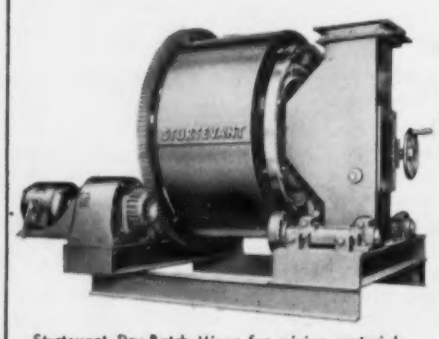
The Sturtevant *Micronizers* are fluid jet grinding machines designed to reduce solid materials to particle sizes in the micron range.

Using compressible fluids, air or steam, as the source of energy, *Micronizers* produce pulverized materials to specifications unobtainable by other mechanical equipment such as ball, pebble or hammer mills.

The variety of materials processed is large and includes both nonmetallic and metallic minerals and ores, metals, pigments, insecticides, fungicides, pharmaceuticals, plastics, dyes and numerous other organic and inorganic products.

It is quickly and easily cleaned on changes of formulation with minimum loss of material. Simple to install and operate. It is available as a machine alone . . . or as a complete grouping with premixing, grinding and bagging equipment. Write for complete information, today.

*Micronizer is the Registered Trademark of the Sturtevant Mill Company.



Sturtevant Dry-Batch Mixer for mixing materials into a homogeneous mass. 5 models: ¼ to 2 tons.

STURTEVANT MILL COMPANY

106 CLAYTON STREET, BOSTON 22, MASS.

Designers and Manufacturers of CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS
MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

equipment and number of driver hours.

Morton tractors cover between 100,000 and 120,000 miles annually, handling all of the company's shipments, except for a very few runs to off-route points, where back-haul loads are not available. For these, the packer uses common or contract carriers.

Mileage has been disregarded as a factor, so long as a full return load is available. On all runs, the basis of operation is cost of fleet carriage against cost of hired carriage.

The fleet is made up of White cab-over-engine tractors, with either gasoline or diesel engines, and three makes of aluminum trailers—Kingham, Kentucky, and Brown.

All of the tractors, except seven diesels operating between either Nashville or Webster City and the west coast, are model 3022 PLT gasoline units of 109 in. wheelbase. They were selected mainly for their ability to haul a 35-ft. trailer within an overall length of 45 ft. Axle weights conform to 50,000-lb. law with a payload of 27,000 lb.

The seven diesels are White Model 9000 Freight Liners with Cummins engines. These power plants are equipped with a new fuel injection system, aim being optimum design for operation over high mileages without adjustment or repair. Especially adaptable to the large payloads allowable on the west coast, the tractors are stated to have enough power to maintain uniform speeds under most stringent road conditions. They incorporate lightweight design, using aluminum and light, high-tensile steel whenever possible.

Trailers are 35 ft. in length, have 6 in. of insulation on all sides, floor, and roof, and are equipped with Model RT-30 Thermo-King mechanical refrigerating units.

CAB-OVER-ENGINE White gasoline-powered tractor is shown with Brown aluminum trailer. Trailer maintains products at —5 to —10 deg. F. in transit.

Ole's Notebook

—*Continued from page 114*

are thus virtually part of the agreement itself. Everyone truly understands what it is all about.

By blowing off some steam in ten monthly sessions, we come into agreement negotiations during the eleventh month with a head of steam that only is a little thing (although ten such heads put together, as in the old way, could make a major explosion).

Thus, both union and management are "conditioning" each other through the longer period—presenting facts in order rather than pell mell, eliminating the fight against time, and substituting facts for emotions.—*"Here's Rogers Again," Rogers Corp., Goodyear & Manchester, Conn.*

Tips on Employee Manuals

You owe every man who works for you some form of employee manual, whether it be a lavishly printed booklet or just a few neatly duplicated sheets.

The manual should be brief, specific, factual, well indexed, and preferably of pocket size. It is issued for the purpose of providing information *but not to persuade.*

And now, don't let enthusiasm predominate in preparing the first edition. Portions of the manual will be out of date within a year, and an obsolete manual is a handicap. So plan to revise it each year and issue fresh copies to all.

Tailor the manual to your annual budget. First cost is the highest. If it's set by letter press, ask the printer to hold the type. Or if it's offset, have the negatives saved, along with several sets of reproduction proofs. Then you'll pay only for the changes you make each year.

Here are helpful suggestions as to contents.

1. Facts about the company, its history, growth, products, achievements, who owns it, notes on its top management.

2. Facts about the job. Working hours, wage scale, payday, vacations and holidays, payroll deductions, overtime provisions, report-in and call-in pay, etc.

3. Employee benefits, workman's compensation, social security, hospitalization, surgical insurance, life insurance, sick benefits, etc.

4. Committees and activities reports, social events, suggestions, plans, welfare committee, etc.

5. Employee health, safety rules and equipment, the fire brigade, housekeeping.

6. Employee obligations, recording of address changes, absence, tardiness, telephone calls, illness, shop rules, quality of workmanship.

7. Seniority lists, lay-offs, recalls, transfers, promotions.

8. The union (if there is one), contracts, membership, check-offs, grievance procedure.

9. What the company offers employees in the way of opportunities.—*Human Relations in Small Industry, McGraw-Hill Book Co.*

OBSERVATIONS

Cost of Turnover

It costs a minimum of $300 to hire, train, and then lose a rank-and-file clerical or factory worker reports Industrial Psychology, Inc.

This figure represents basic investments in the employee and does not include replacement costs, unemployment compensation costs, slowdowns in production, etc.

Surveys also indicate that about 1 out of every 4 workers is a marginal performer—i.e., the company is fortunate if it breaks even when productivity is balanced against overhead.

High Cost of Absenteeism

Sickness-and-accident absenteeism costs American business an estimated $9 billion a year—or about $1,275 every second of every working day. So reports the Small Business Administration.

In Behalf of Progress . . .

Don't Undermine the Man on the Firing Line

Complexities of modern industrial operations have created a strong trend toward the use of functional experts, or specialists.

These are men who know more about such things as automation, statistical quality control, standard costs, and training methods than the man in charge of production.

It is important to use such specialists, either as members of the executive staff or as outside consultants hired by top executives.

But it is just as important to employ their services and know-how properly. Else they will fail to achieve results. Or worse, they may cause serious trouble.

We like the way this situation was sized up by the general manager of the Heinz Pittsburgh factory, F. Y. Tiernan, at a manufacturing conference of American Management Assn.

Multiplication of staff men, conferences, reports, and surveys in industry was criticized. By giving the production executive "help" in the form of innumerable staff men who specialize on certain functions, new problems have been created for him, Mr. Tiernan observed.

The production man needs help, says the Heinz executive, but he "resents staff people who report to their functional head, who in turn contacts his superiors. He resents demands on his time, not only in putting out fires but in answering many false alarms. In seeking to give him help, how did we ever open Pandora's box?"

The production man should ask for, and welcome, help from staff men. But he must accept his own responsibility and exercise his own authority, Mr. Tiernan points out. "He should give his opinion firmly and sign his name." And the staff man should gain the confidence of production supervisors by sincerely trying to work with, and through, them.

To these observations might be added this concept: The staff man's value to a company should be measured by his ability to win the cooperation of production supervisors—not by the degree to which he can "show up" these men in critical reports to top management.

All progress in the battle for improvement must funnel through the man on the firing line—the man who puts progress to work to produce benefits for his company. To make new methods work, and to effectively handle the multitude of problems that harass him daily, this man must feel free to make decisions.

And he must not be afraid to be wrong on occasion.

Will "Product Merger" Set New Success Pattern?

Inspired by trends and problems of the times, a success idea seemingly without exact parallel in the food manufacturing industry has been born. It takes form in the creation of Aquafoods Corp., Tampa, Fla., announced by President Jaxon O. Hice.

This enterprising young man, you may recall, is the former small-town newspaperman who founded SeaPak Corp. on a shoestring in 1949. Then he built it up to an $8 million a year business—on the principle that people will pay a price for quality.

Under the world-famous Carnation trademark, this new company will sell quality frozen and canned seafoods in this country and abroad. It will handle quality packs from some 30 processors, who will make a 5% profit on production costs for that part of their pack taken by Aquafoods.

Engineering and research help will be provided to participating packers to improve efficiency and quality. New products will be developed in a central lab and test kitchen, with an eye on new convenience items to build new business.

Production and market data will be electronically processed to put vital business facts in the hands of the executives quickly, for ahead-of-the-trend decisions.

Advertising and merchandising will be pushed with big-company force, the anticipated ad expenditure being $2 million for the first year. "Price" selling will be avoided, and "dealer franchise" barriers will be broken.

Sales-motivating packages are being designed by a leading container stylist. One will be a sealed foil envelope in which the shrimp can be boiled for cocktails.

New product ideas will be of the "free swinging" variety—such as fish flakes molded into piscatorial shape and striped with food colors—in children's sizes, even.

A $50 million sales volume is anticipated next year.

All of this is projected from an initial capitalization of only about $400,000. You see, the company will own no plants. Will take title to no products.

Successful achievement of Aquafoods' plans—plus attainment of its hope to increase consumption of seafoods—may have a sizable impact on the fish field.

Could be, too, that Aquafoods will prove a success pattern for smaller food firms through "product mergers."

But it cannot succeed unless quality can be peddled at a commensurate price on a mass basis.

It will bear watching.

When shoppers compare your products with other brands...

...CELITE FILTRATION provides perfect clarity... assures appetizing appeal

In today's highly competitive market, it is vitally important that processed food products *look* good as well as *taste* good. For in a shopper's eye clarity is often a measure of purity. That's why so many processors are turning to Celite* diatomite filtration.

By means of a filter cake hundreds of times finer than the finest wire mesh, Celite polishes liquids to a dazzling clarity. And it does it economically, too. Celite is low in cost. It provides practically automatic operation with any standard pressure filter. And you needn't worry about a clarification bottleneck. Celite works at fastest flow rates.

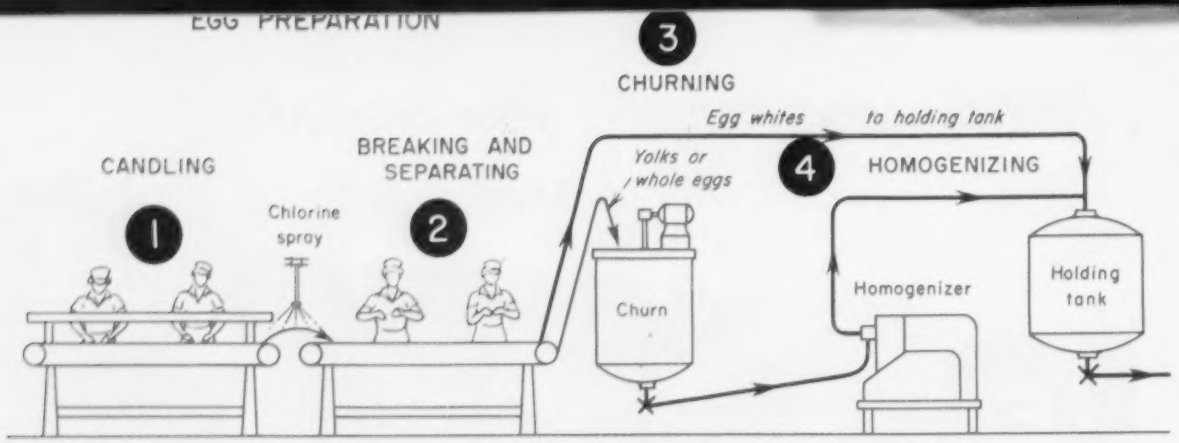
Thousands of processors are using Celite today for filtering sugar, beer, fruit juices and jellies, cooking and salad oils and many other products. Why not ask one of them about Celite. Better still, get the complete story from Johns-Manville.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

When you filter your product with Celite you get the extra sales appeal of sparkling clarity.

Tell us what you make. We'll tell you if and how Celite can help you make it better. Write to Johns-Manville, Box 60, New York 16, N. Y. In Canada, Port Credit, Ontario.

JM PRODUCTS **Johns-Manville CELITE FILTER AIDS**



Straight-Line Egg Solids Production

Latest Advances in Top-Volume, Continuous Stabilizing and Dehydration Depicted in Model Layout

MANUFACTURE of quality egg solids has reached a pinnacle in U. S. plants–as revealed in this special foldout wherein FE has drawn upon the operations of four leading dehydrators to portray a model, comprehensive line.

Referring to the diagram, cases of fresh eggs come in to the candling station–Point (1)–where they are examined for presence of meat and blood specks. Eggs are then broken and yolks separated from the whites–Point (2). A trained inspector eliminates any with off-odors.

Churns and a homogenizer–Points (3) and (4)–blend yolks and whole eggs into smooth, uniform products. Whites by-pass this operation and go directly to holding tanks.

From these latter units, eggs go to two general processes –production of egg white solids and manufacture of yolk and whole egg solids.

Spray and Pan-Drying Operations

Let's briefly follow the egg white line: Liquid whites are preheated before going into a stabilizing tank for fermentation–Point (5). From here, whites can be either pan or spray-dried. In the first process, they are poured into pans and dehydrated with circulating hot air in two drying stages–point (6). Latter method makes use of spray nozzles and a hot air blast.

For the full details behind this advanced Flowsheet, see Special Report—pages 77-85—beginning with "Egg Solids to Forefront."

Albumen is finally sifted and then packed into drums –Point (7).

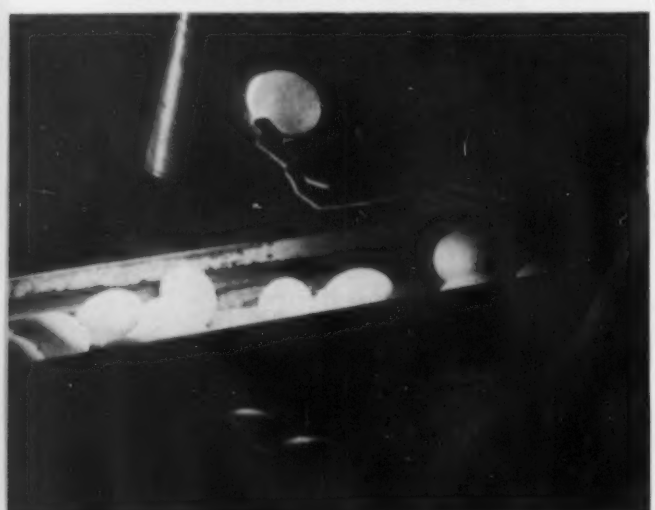
Liquid yolks and whole eggs are also preheated before going into stabilizing tanks–Point (8). After enzymatic action is completed, product is chilled and pumped to holding tanks.

Flash-pasteurization follows–Point (9)–and eggs are then delivered by high pressure pump to the spray driers –Point (10).

Sifted yolks and whole egg solids are packed into drums –Point (11). Grinders are provided on both whites and yolk lines to crush lumps removed by the sifters.

FOOD ENGINEERING September 1955 Pages 122-125

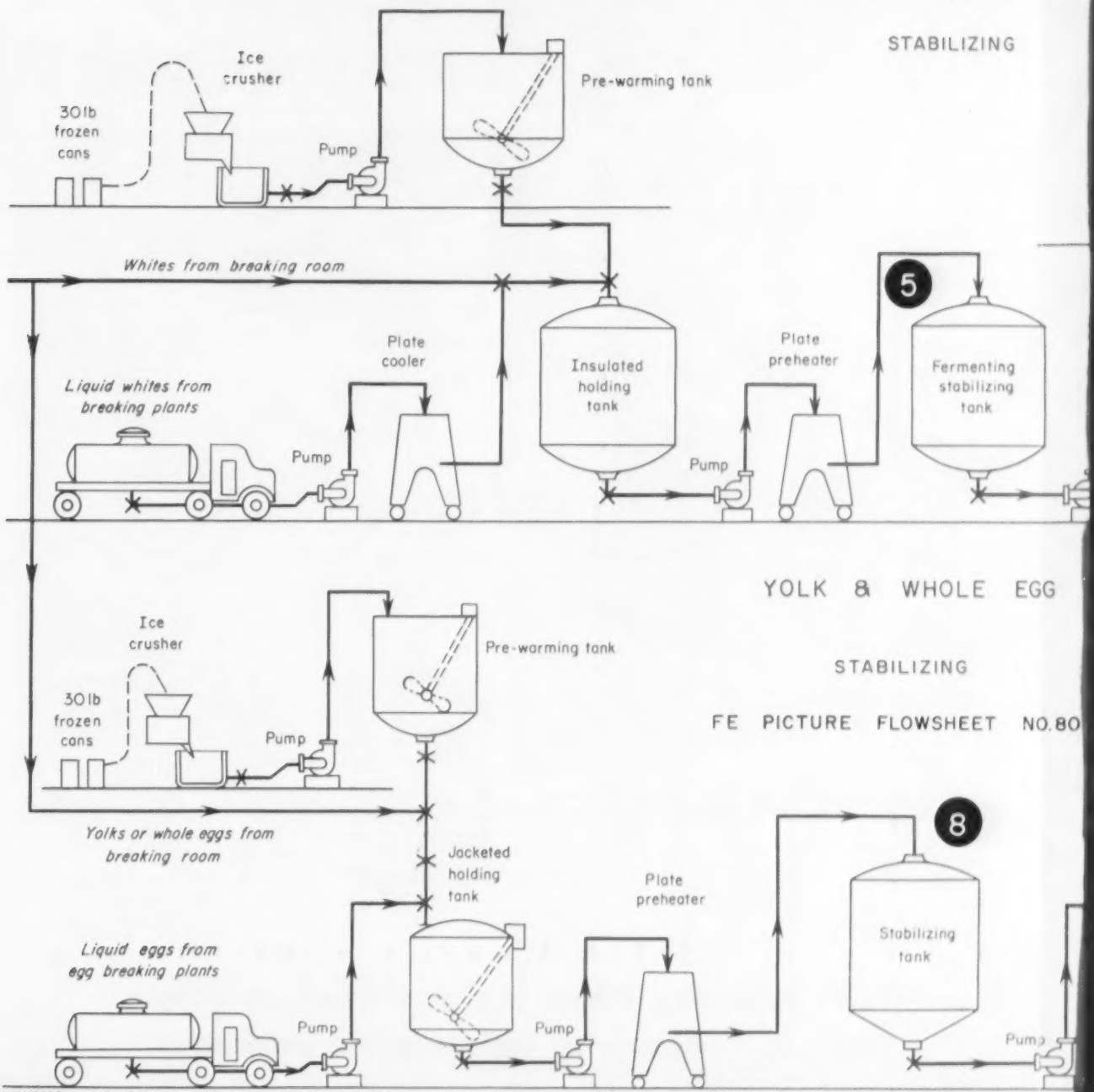
1 CANDLING, carried out in darkened room, discloses presence of defects that call for egg rejection.



2 BREAKING-LINE GIRLS separate yolks from whites into 3-egg cups. Off-odor eggs are removed.

WHITES PROCESSING

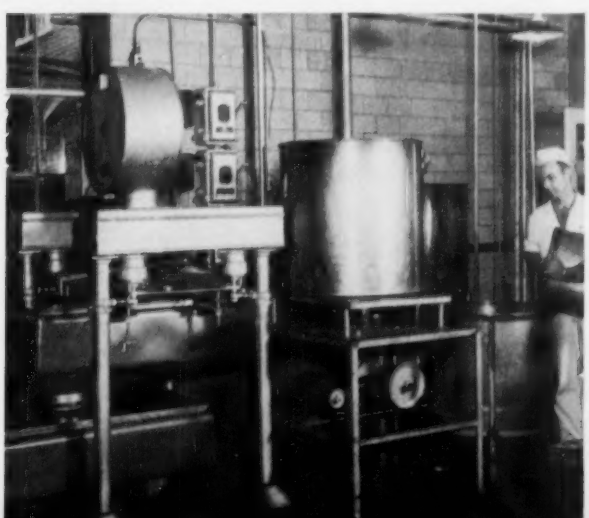
STABILIZING

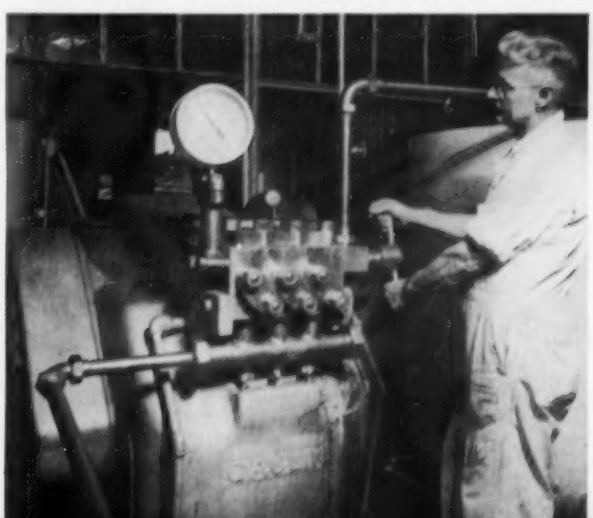


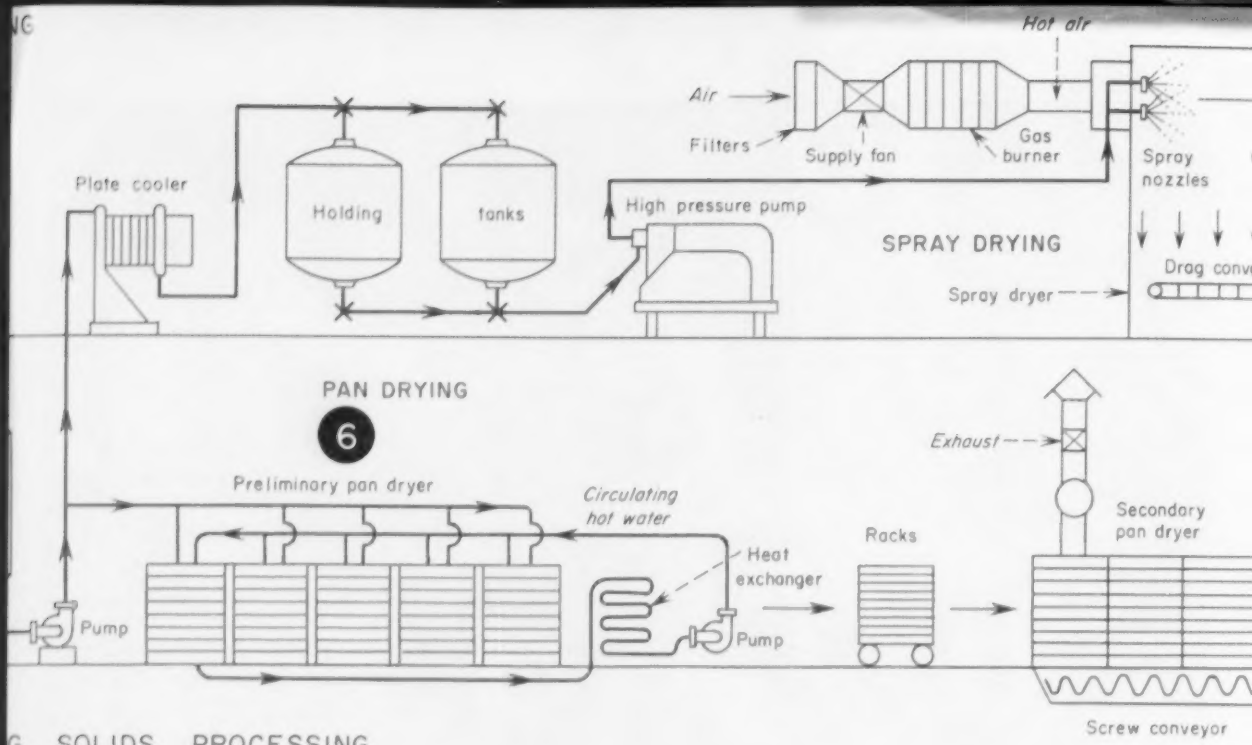
3 **CHURNS** gently blend yolks and whole eggs without whipping, insure a smooth product.

4 **HOMOGENIZER** completes blending process. Eggs are then screened to remove any shell or membrane.

5 STA... whit...



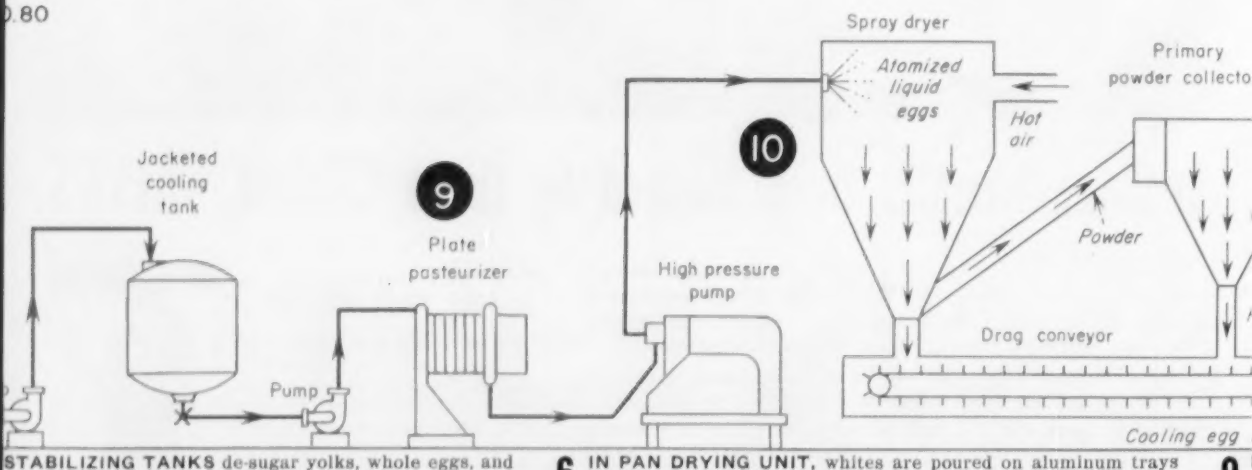




G SOLIDS PROCESSING

PASTEURIZING

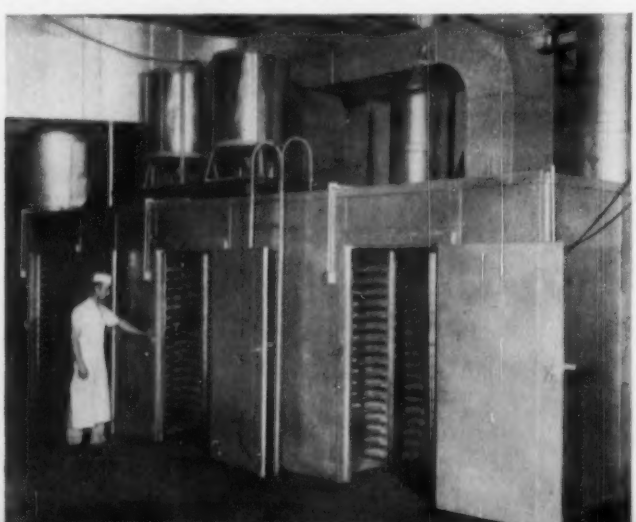
SPRAY DR

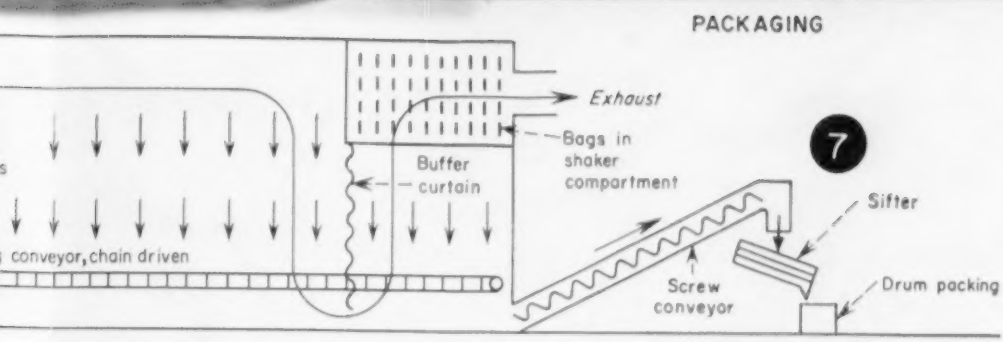


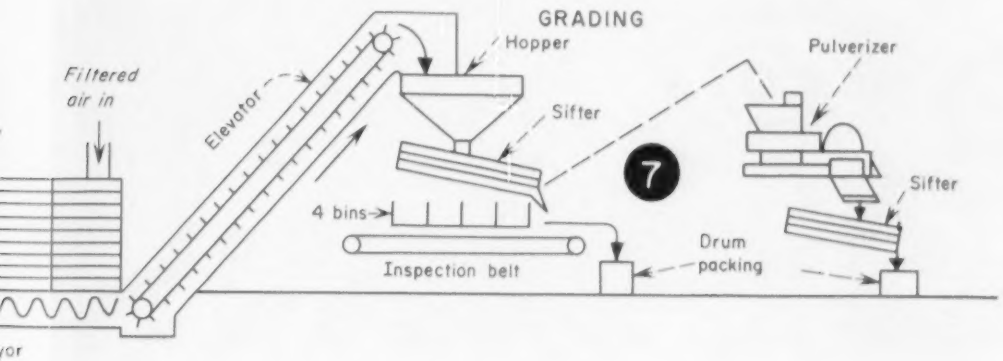
STABILIZING TANKS de-sugar yolks, whole eggs, and whites by enzyme action or fermentation.

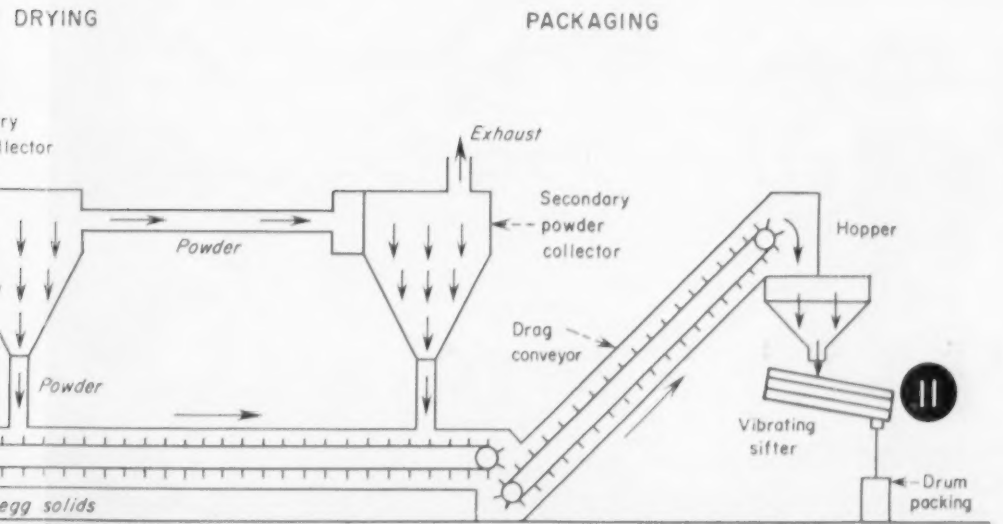
6 **IN PAN DRYING UNIT,** whites are poured on aluminum trays and dehydrated with circulating hot air.

9

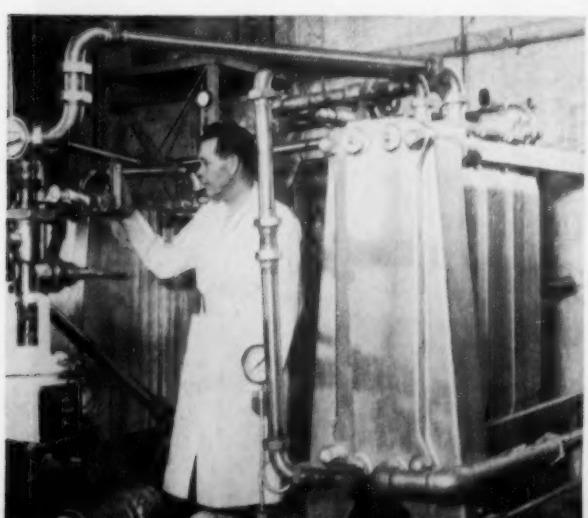




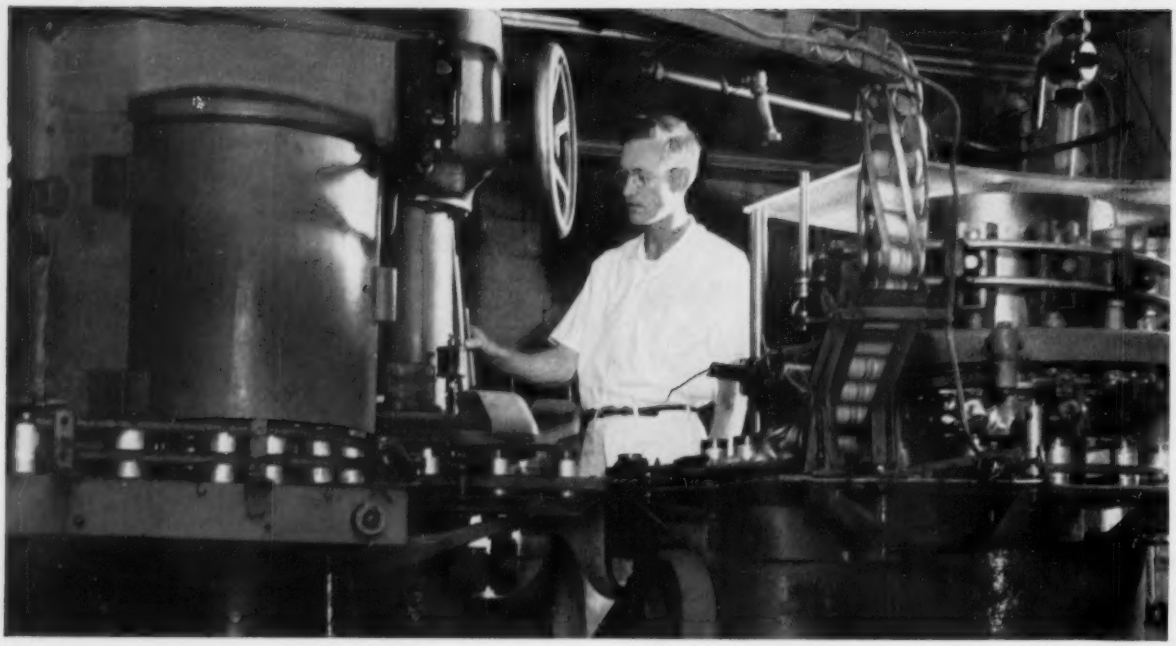




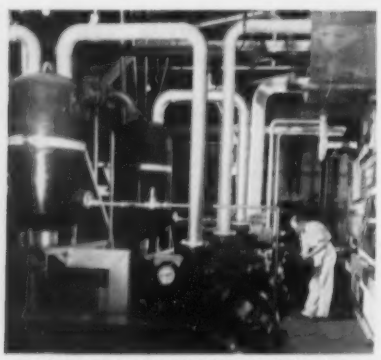
9 **PLATE-TYPE** heat exchanger flash-pasteurizes stabilized eggs to check bacterial growth.



10 **SPRAY DRIED** liquid eggs are pumped under high pressure through atomizers. Collectors are at right.



How "Freon"* helps Florida Food Products retain 98% natural flavor in processing orange juice



REFRIGERATION SYSTEM CONTROLLING all cooling and freezing at Florida Food Products is charged with "Freon". It is the heart of the plant.

"FREON" KEEPS TEMPERATURES at constant 8°-10° below zero in storage room where orange-juice concentrate awaits shipment all over the country.

To secure higher natural flavor in their concentrated orange juice, Florida Food Products of Eustis, Florida, uses the new Hi-ester process which employs refrigeration instead of steam to extract water from the raw fruit.

Absolutely uniform freezing temperatures are essential. Production manager Francis Borgard says, "We've found we can rely completely on 'Freon' refrigerants for the temperatures which enable us to retain 98% of the natural flavor of orange juice."

Equally important in Mr. Borgard's opinion are the safety and reduced maintenance his company achieves with refrigeration equipment charged with "Freon".

"Freon" saves power consumption

Florida Food Products processes as many as 10,000 boxes of fresh oranges every 24 hours, and the power savings made possible by "Freon" are substantial, notes Mr. Borgard. "With 'Freon' our compressors can be driven by 60-horsepower motors, instead of 100-horsepower motors required by another type of refrigerant."

"Freon" is a money saver in other ways, he points out. It doesn't corrode lines. Should a leak develop, it would be harmless to employees and the product.

Expect "Freon-22" to increase efficiency 50%

The plant has eight Vilter compressors now charged with "Freon-12". During the shutdown period the company plans conversion to "Freon-22". "We expect to increase efficiency of our equipment 50%," predicts Refrigeration Superintendent Eugene Phillips. "'Freon-22' will give us a lower boiling point plus all the safety factors of 'Freon-12'."

"There's no question in my mind that 'Freon' refrigerants are the best now being made," he adds. "I'm convinced it would pay other companies to use 'Freon', even taking into consideration their conversion costs."

Take a tip from Florida Food Products and take advantage of the performance of Du Pont "Freon" refrigerants. They're nonflammable, nonexplosive, virtually nontoxic. There is a "Freon" refrigerant for your process no matter what type or size of installation you have. Write for full information to E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division 89, Wilmington 98, Delaware.

KINETIC

FREON

REG. U. S. PAT. OFF.

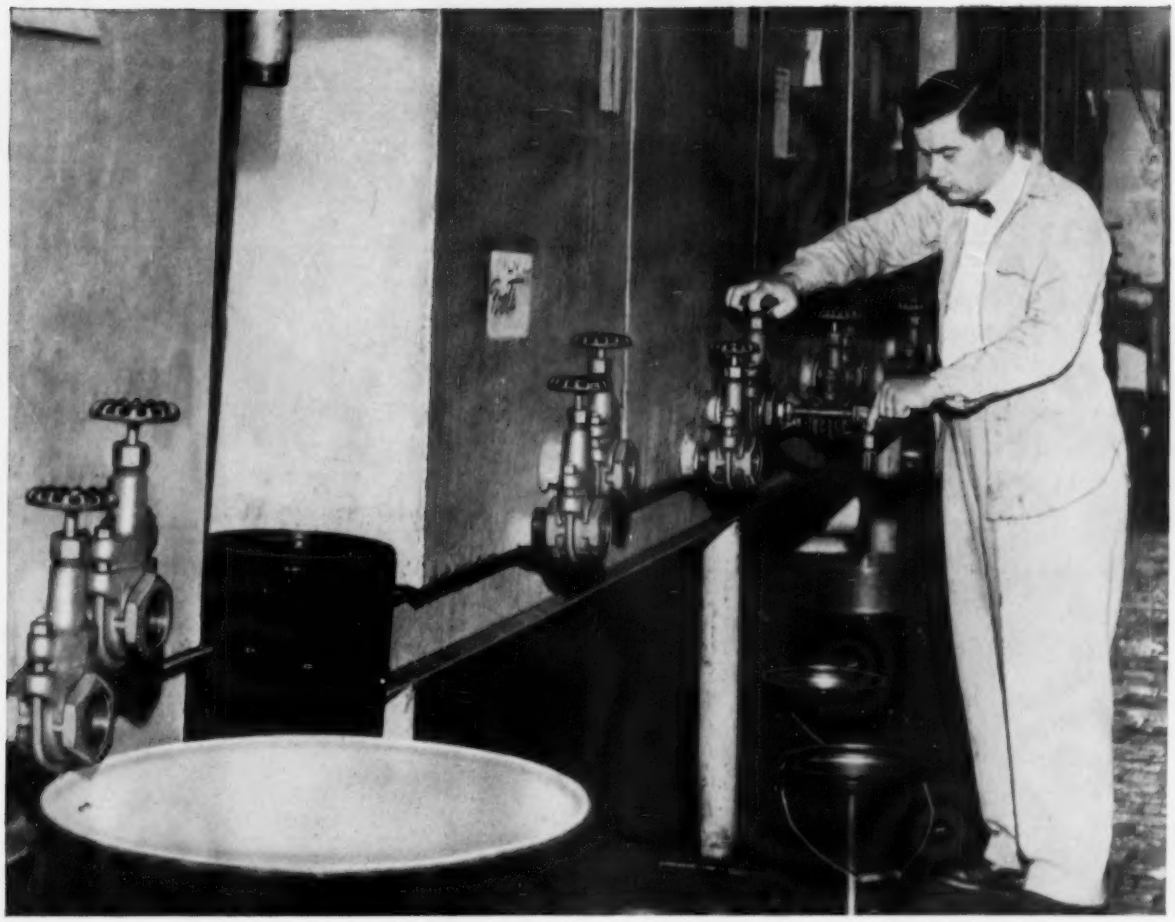
SAFE REFRIGERANTS

**"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants.*

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY



Leakage troubles here stopped by these CRANE VALVES

THE CASE HISTORY—Read why Hysan Products Co., Chicago, changed to Crane Clamp Gate Valves in all process and storage piping. Hysan makes liquid waxes, pine oil and coal tar disinfectants, liquid soaps, and similar chemical specialties.

Valves formerly used were similar to Crane Clamp Gates, but only in appearance. They lasted no more than 2 to 6 months—leaking at seats and disc with no more than 3 to 12 operating cycles daily. Maintenance and replacement costs mounted—as did down-time losses. The leaky valves on tank lines forced repeated transfer of storage stocks. As many as 3 men were needed to make valve repairs.

All this trouble stopped when the plant installed Crane No. 488 Clamp Gates. After almost 2 years' service, these valves show no sign of wear or leakage. An occasional pull-up on the packing is all they need—and one man handles all piping maintenance.

CRANE CLAMP GATE VALVES

Rugged design with careful, close tolerance machining, especially on seating surfaces, sets these Crane valves apart from others. They give long-lasting tight closure under frequent operation and on hard-to-hold fluids. Many patterns to choose from—all-iron or brass-trimmed. See your Crane Catalog or Crane Representative.

CRANE CO.

General Offices: 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

CRANE'S FIRST CENTURY . . . 1855-1955

For more information, use coupon on last page.

fruity...

salty...

or creamy...

Your specialty items look as good as they taste in Continental tailor-made packages

Is your product listed here?

Let us show you containers designed for:

brown bread	glazed fruit	plum pudding
candy	ice cream mixes	popcorn
date bread	nut bread	potato chips
fountain syrups	nutmeats	pretzels
fried noodles	nut butter	shoestring potatoes
fruit cake	peanuts	syrups

and many other food specialties

Persuading the casual shopper to buy your out-of-the-ordinary foods calls for out-of-the-ordinary packaging. At Continental, our designers and lithographers are past masters at making your package look as colorful and tempting as its delightful contents. Let us give you all the attractive cans you need, exactly when you need them. And if you'd like help with research or engineering, you'll find it available at a moment's notice – suited to your individual problems. Call Continental soon. You'll be glad you did.

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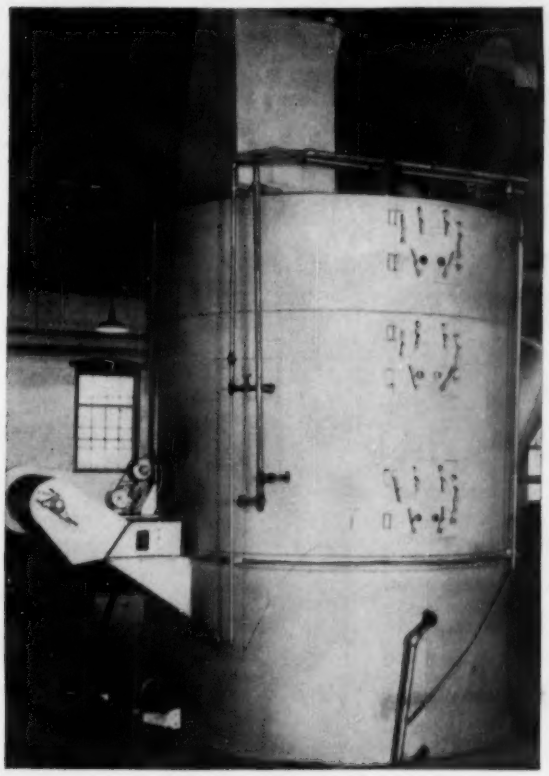
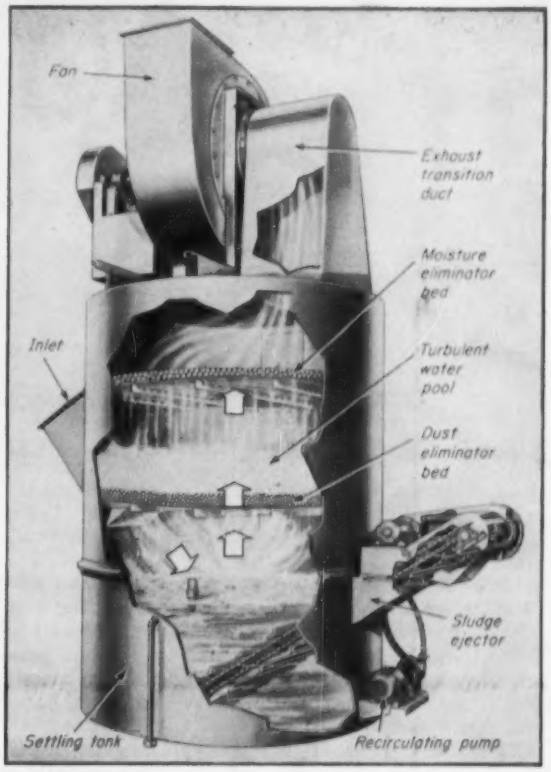
PACIFIC DIVISION: Russ Building, San Francisco 4

NEW EQUIPMENT & SUPPLIES





Efficient Dust Collector Employs 3-Way Separation

High separating efficiency of this dust collector is attributed to a novel design that provides a relatively long period of good air-water contact.

Equipment (Hydro-Filter) employs three-way separation. Lighter particles which are not removed as air strikes the still water of the settling tank are eliminated by: (1) Entrapment within falling water droplets, (2) impingement on bubble surfaces, and (3) retention on wetted surfaces of glass spheres. A constant and automatic air-water balance permits effectiveness over wide variations in volume and flow rate.

Filter's operation can be seen from cutaway. Dust-laden air is drawn into unit through inlet (left) which directs air stream against surface of water in bottom settling basin. Air collides violently with water, leaves considerable dust, then is directed upwards. As it rises and circulates in area above settling basin, it is subjected to a steady rain of water droplets.

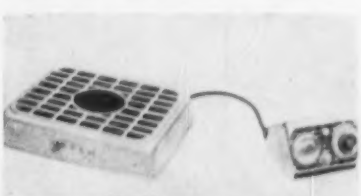
Next, the stream approaches a horizontal bed consisting of layers of glass spheres. This scrubber bed is kept saturated with water by a suspended pool on its top surface. Depth of this pool creates a slight hydraulic pressure at top of bed which forces water down over surface of glass spheres, in opposition to upward flow of air.

Air-borne dust entering lower side of bed is promptly impinged on wetted surfaces of glass spheres. This action removes more contaminant. After penetrating a short distance into scrubber, air is converted into small bubbles which undergo rough treatment in their passage upwards through the water pool.

After escaping through water layer, relatively clean air progresses upward through another rain of water droplets and through another bed of glass spheres. This time, spheres serve to remove water droplets carried along with air after scrubbing. Fine droplets of liquid impinge on surfaces of this entrainment separator and coalesce to form large drops which fall back to the turbulent layer. Cleaned and dried air, upon leaving entrainment separator, passes directly to outlet at top.

There are no moving parts within the dust-collection area—air, water and glass spheres do the work—thus maintenance is minimized. Continual flushing of the filter bed and automatic sludge removal make the unit self-cleaning on a round-the-clock basis.—*National Dust Collector Corp., Machinery Hall Bldg., Chicago 6.*

Circle 129A on Reader Service Card

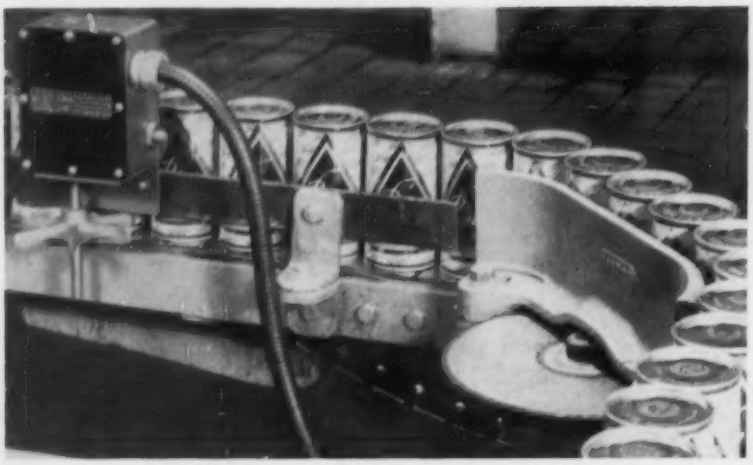


Portable Electronic Scale Has High Load Rating

Concentrated loads—up to 40,000 lb.—may be accurately weighed by this portable unit which employs a manual null-balance circuit. Up to four platforms can be read from one indicator.

Designed for severe service, low-cost scale has no vacuum tubes or delicate parts. Dimensions: 11x14x4 in.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*

Circle 129B on Reader Service Card



Electric Contactor Simplifies Package Counting

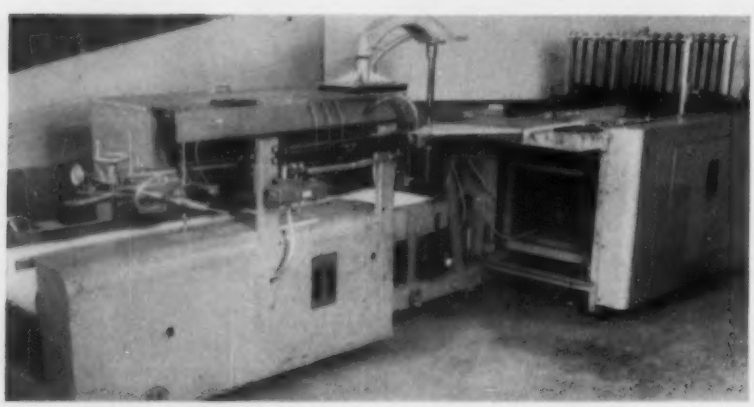
Closer production control on packaging lines, with savings in reading time and maintenance, are advantages cited for an electric contactor that actuates a centralized panel-mounted counting system.

Waterproof construction of the contactor (E-S-5-X) is termed particularly advantageous in bottling and packing plants, since unit is not affected by washdown operations.

Contactor with star wheel functions on the conveyor line as an actuator of the electric counter to which it is connected. As many contactors and counters are used as there are lines and stations. Counters are placed in a dry, clean location in panel formation, and count of each production line is taken from a centralized panel. Thus, production can be determined at a glance for all points in the plant.

Unit is gear-reduced to count ten for each contact, thus prolonging service life of both contactor and counter. Switch within contactor is sealed against moisture and dirt to cut maintenance.—*Durant Mfg. Co., 1929 N. Buffum St., Milwaukee 1.*

Circle 130A on Reader Service Card



Unloads 6-12 Cases/Min., Rejects Broken Glass

Designed for use with maker's unscrambling tables, this automatic carton unloader is termed easily adjusted to handle most shapes and sizes of glass in any standard carton.

Called "Styl-O-Vac", unit gently unloads 6 to 12 cases per min. according to unscrambling and filling speeds. Downtime is said to be eliminated as broken bottles remain in carton and changeover from one size to another is reported at less than 5 min.

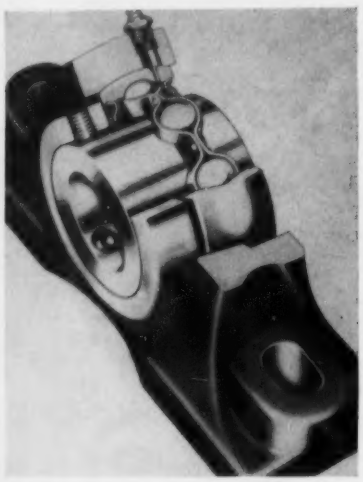
In operation, carton enters first conveyor and advances towards raised roller stop. Here, it contacts a limit switch that opens outer flaps by vacuum, then is transferred onto high speed belts toward unloading position. In doing this, it raises roller stop to halt succeeding cartons.

At unloading station, carton actuates a limit switch that opens inner flaps. These, in turn, contact a switch that lowers vacuum head onto carton. Suction holds containers to the head as they are lifted out of the carton right side up.

Then, lifing head rotates 90 deg., and vacuum is released to deposit containers on unloading plate of unscramler. At the same time, empty carton is ejected from unloading position and glass is automatically pushed onto unscrambler.

Unit's dimensions are 6 ft. wide by 9 ft. long, while conveyor elevation is about 21 in. Left- or right-hand unloading is available—*Island Equipment Corp., 27-01 Bridge Plaza North, Long Island City 1, New York.*

Circle 130B on Reader Service Card



Shaft Sizes Increased In New Ball Bearings

A series of ball bearings (SCM), designed for medium-duty service, is available in larger shaft sizes for increased load-carrying capacity. Included are ball-bearing pillow blocks and flange-cartridge mounts.

Pillow block's semi-steel outer housing offers greater strength and streamlined appearance. Self-alignment is provided by spherical outer race of inner unit, which fits accurately into spherical seat of semi-steel housing.

Metallic-backed synthetic seals are mechanically anchored to withstand grease-gun pressure. Lubricant is effectively sealed in, while dust and dirt are excluded. A locking pin prevents rotation of outer bearing race, while the bearing is securely locked to shaft by two set screws through the collar.

Units are completely assembled, factory adjusted, pre-lubricated, and ready to mount. Both types are available in popular transmission sizes.—*Dodge Mfg. Corp., Mishawaka, Ind.*

Circle 130C on Reader Service Card

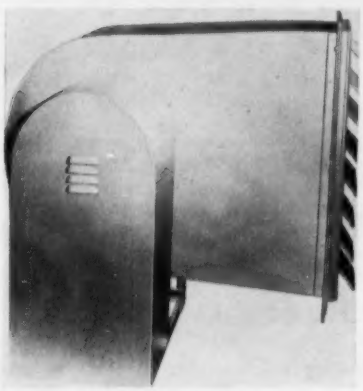
Hydraulic Closure Eases Filter Press Cleaning

Seen increasing efficiency of filter press opening and closing is a manually-operated hydraulic device that provides a high power-to-work ratio.

Called "Handraulic", it requires no additional support—thus can be added to existing presses in the field without alterations, reboring, or removal of plates. Unit replaces the filler block and is locked into position with the slide head by a cap screw. Weight and rod are assembled to the filler square, and original closing device remains as stand-by unit.

In operation, hydraulic power, maximum pump leverage, and pressure-gage control minimize number of operators required. In cleaning, closing device swings horizontally out of position to allow slide head to be moved back, thus providing maximum working space.—*D. R. Sperry & Co., Batavia, Ill.*

Circle 131A on Reader Service Card



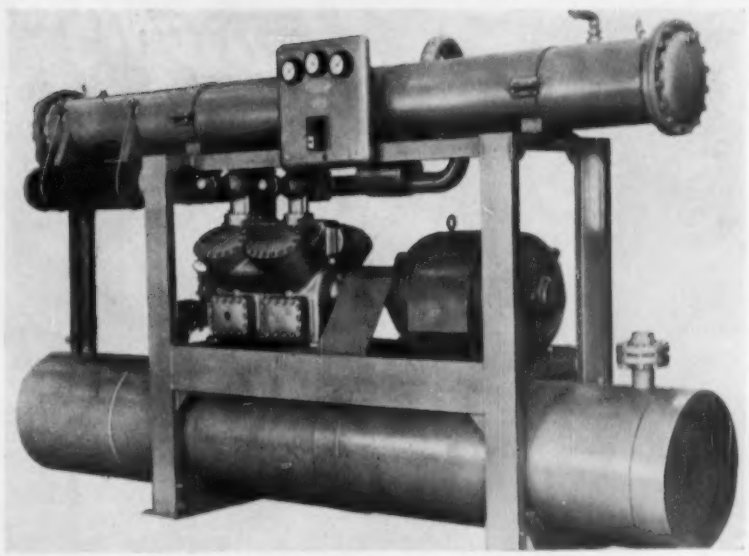
Moist Air Exhausted By Efficient Blower

A new utility exhaust blower, designed for more efficient movement of moisture-laden air, is especially recommended for use in food plants.

Constructed of galvanized steel on rigid angle-iron frame for roof-top mounting, unit has enclosed motor and drive for protection against weather. Also included as standard equipment are automatic shutter that closes when blower is not operating, and heavy-duty blower wheel.

Units are available in four sizes—15 in., 18 in., 21 in., and 24 in. SWSI—with ½ to 3-hp. motors for movement of 2,000 to 9,000 cfm.—*King Co., 902-10 North Cedar St., Owatonna, Minn.*

Circle 131B on Reader Service Card



Packaged Water Coolers Fit in Minimum Space

Shown above is the 75-hp. unit of a new line of "packaged" water coolers, designed for air conditioning and process refrigeration. Twelve sizes range from 5 to 125 hp.

Models available from 25 to 75 hp. (under 100-ton capacity) are termed particularly suitable for installations where space is critical. All components—compressor, condenser, and cooler—come as a signal unit, efficiently piped, filled with oil and a holding charge of refrigerant. Mounted in a structural steel frame, units can be easily and economically installed. A few water and electrical connections complete the installation.

Smaller models require minimum space because compressor, cooler, and condenser are assembled in a vertical plane. Larger capacity units have side-type assembly similar to centrifugals. All units are assembled and tested at the factory.

Key to the system is a reciprocating compressor constructed of durable and easily replaceable components. Built for heavy-duty operation, they are available with maker's automatic capacity control which unloads cylinders for matching compressor operation to cooling requirements. Automatic unloading at startup results in reduced driver costs.

Small water chillers from 5 to 20 hp. are equipped with hermetic compressors which are enclosed, have no shaft seal, and are charged with refrigerant.—*Carrier Corp., Syracuse.*

Circle 131C on Reader Service Card

Container Car Provides Bulk-Shipping Economy

Especially adapted for powdered or granular products, the 28 containers of this new-type railroad car carry a 50-ton payload that can be loaded or unloaded in less than an hour by one man.

Car has sides and overhead bars that lock its complement of rectan-

New Sarco Thermodynamic Steam Trap practically eliminates maintenance!

Only moving part—a hardened Solid Stainless Steel Disc—practically wear-proof!

SOME OF MANY ADVANTAGES

1. Same trap for all loads and pressures 10-600 psi.

2. Closes tight on no load.

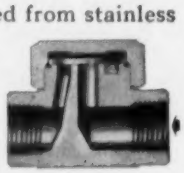
3. Operates against back pressures up to 50% of inlet pressure.

4. Not affected by superheat, water-hammer, vibration, corrosive condensate.

5. Smallest inventory of spare parts.

SIMPLICITY—to the Nth degree!

No valve-closing mechanisms to wear or stick. No critical clearances to choke. No gaskets to leak. Three simple parts...machined from stainless steel bar stock. Only one moving part.
What could be simpler?



SARCO COMPANY, INC.

2133-B

Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

Please send me: ☐ Bulletin 255-44
☐ A Sarco Thermodynamic Steam Trap for 60-day trial. Size_____ for installation on_____

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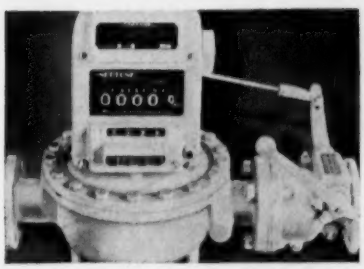
gular aluminum containers in place. Each container has a capacity of 74 cu. ft., and is designed for easy movement with a fork-lift truck. They can be filled either on or off the car through an opening in the top, and are emptied by tilting to a 45-deg. angle. Contents then pour out through a discharge door at the bottom.

The system is seen particularly attractive to the shipper or consignee whose plant has no rail siding. With this method, a car may be received at any railway yard and containers are moved to his plant by truck. Furthermore, with 28 containers, different grades or products can be handled on the single car.

Savings are expected through: Reduced cost of loading and unloading; elimination of damage or loss of product through deterioration, contamination, or wetting; and since containers can also be used for storage, reduction of storage-facility investment required when hopper or box cars are used.—*Shippers' Car Line Corp., 30 Church St., New York City 7.*

Circle 131D on Reader Service Card



Accurate Cutoff Employed In Automatic Flow Meter

Automatic delivery of water, syrups, and oils is offered by a new meter (Type S Auto-Stop) that uses a double-trip valve for accurate cutoff and minimum hydraulic hammer at high flow rates.

Units are available in 1½-in. and 2-in. sizes. When used with low viscosity liquids, the double-trip or cushioned-stop mechanism slows down the fast-moving stream an instant before it shuts off the flow. Meter is also designed with wide, smooth internal passages for straight flow to eliminate turbulence and reduce pressure loss. Furthermore, valves are easily opened against high line pressure.

For viscous liquids at low rates of flow where there is no danger of hydraulic hammer, maker offers the valve with a single-trip mechanism. In these applications, low loss of head and easy-opening are of primary importance.

Meters are of the positive displacement, nutating-disk type, and operation is termed simple and positive. Tripping mechanism on the register is first set by pushing bottom buttons until number of gallons or pounds required shows up in the window just above buttons. Main numerals are then cleared back to zero by turning reset handle on right side of register. Opening the valve starts liquid flow which is automatically cut off by meter.

Also available with these meters for control of pumps, agitators, and valves is an explosion-proof electrical switch (Auto-Switch). Latter is actuated automatically when desired quantity of liquid has passed through the unit. Meters are of bronze construction and have the following rates of flow: 1½-in., 10 to 100 gpm.; 2 in., 16 to 160 gpm. —*Neptune Meter Co., 19 W. 50th St., New York City.*

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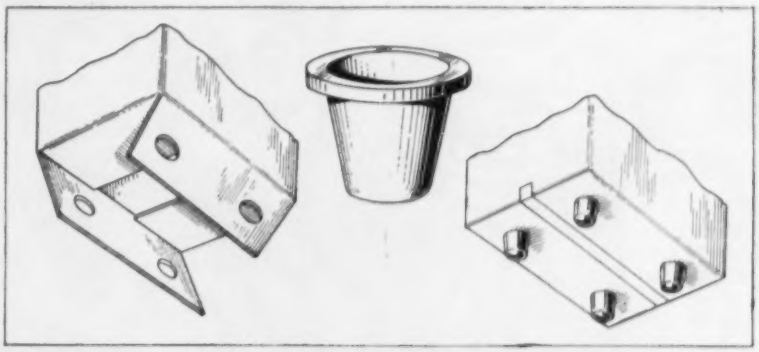
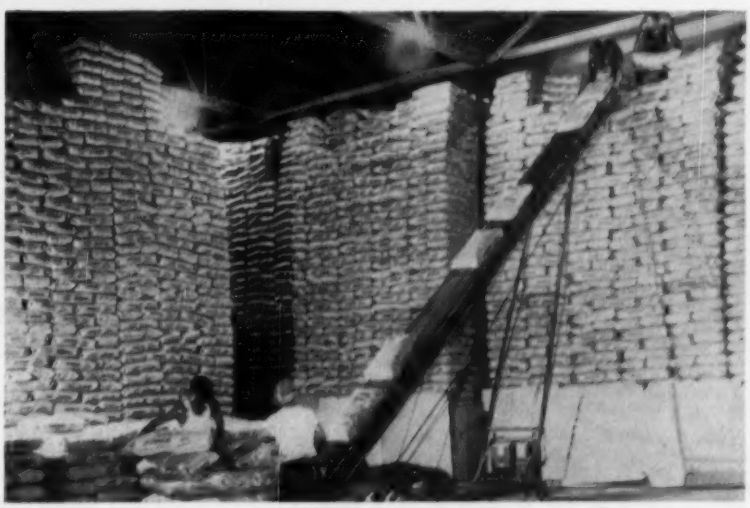


Metal Cup Attachments Simplify Material Handling

When used on containers or skids, these sturdy metal feet offer maximum stacking strength. Furthermore, they nest without binding for convenient storage.

Cited as particularly suitable for service where reuse is a factor, units (Pallet Kups) are inserted into die-cut holes on bottom flap of container. A flange holds them in place. Feet may also be incorporated into a separate "paper" skid. In this case, the board is overlapped to permit insertion, and then stitched up.—*Gaylord Container Corp., 111 N. Fourth St., St. Louis 2.*

Circle 133B on Reader Service Card



New Conveyor Belt Has Increased Gripping Power

Specially ridged and cross-cut rubber surface of this 33-ft. conveyor belt (Ribflex) elevates 100-lb. paper sugar sacks six at a time, at new warehouse operated by Haslett Warehouse Co., Stockton, Calif. Bags ascend 24 ft. at 45-deg. angle and are stacked 42 high. Formerly, they could be raised only three at a time up a 35-deg. incline for stacking 30 high.—*B. F. Goodrich Co., Akron, Ohio.* (Circle 133C on Reader Service Card)

Satisfaction rests on the carton

The first requirement of a good shipping container is *protection*—and The Procter & Gamble Co., maker of Crisco, knows by experience that Union corrugated containers are dependable. Another important consideration is *merchandising effectiveness.* Good design and good printing combine to make this box a winner.

TRADE MARK UNION
INTEGRATED PLANNING
INTEGRATED PRODUCTION

UNION BAG & PAPER CORPORATION

CORRUGATED CONTAINER DIVISION • Box Plants: Savannah, Ga., Trenton, N. J., Chicago, Ill.

Eastern Division Sales Offices: 1400 E. State St., Trenton 9, N. J. • Southern Division Sales Offices: P.O. Box 570, Savannah, Ga.
Western Division Sales Offices: 4345 West Palmer, Chicago 39, Ill. • Executive Offices: Woolworth Bldg., New York 7, N. Y.

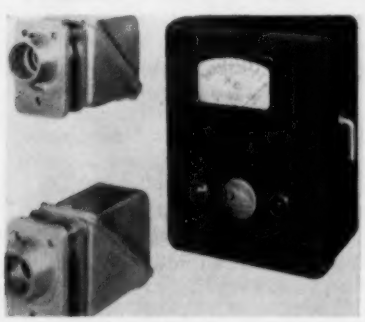
Magnesium Pallet Dolly Is Light and Strong

Redesigned for light weight, durability, and maneuverability, this line of pallet dollies offers extruded magnesium frames, hardened steel axles, and phenolic resin rollers with factory-lubricated sealed bearings.

Units are available in capacities to 4,000 lb. (average model weighs 37 lb.) and in sizes ranging from 36 in. x 36 in. to 48 in. x 48 in. Tilt construction, rounded-side rollers, and heavy-duty roller bearings are said to provide easy manual movement and 360-deg. turning.

Moreover, interchangeability of parts permits adding or removing of rollers to increase of decrease capacity. —*Magnesium Co. of America, East Chicago 19, Ind.*

Circle 135A on Reader Service Card



Electronic Densitometer Has Many Applications

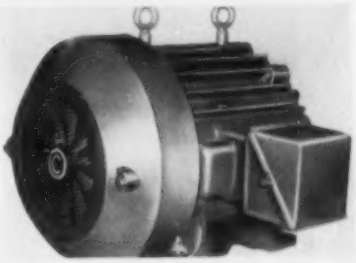
Eliminating smoke nuisance in industrial stacks and ventilating ducts, monitoring light transmission or optical density of liquids in processing lines, and regulating turbidity in water and sewage treatments are applications cited for a new densitometer.

Ready-to-use photoelectric control (set P4S) consists of a light source, a photoelectric scanner, and control unit with a meter whose scales indicate percent transmission and optical density. Control is provided at any light transmission value from 90 to 0%. Green light indicates normal condition, red light excess smoke or density.

For smoke density control, unit automatically turns off blowers, closes dampers, and operates multiple warning devices. When used in continuous process operations, it indicates and controls composition of fluids by monitoring their turbidity or variations. Plug-in construction of chassis and meter simplifies installation, maintenance, and replacement. Control relay is energized with light on phototube, and de-energized when light decreases to selected transmission.

Operating range is 20 ft. maximum between light source and scanner, which can be as far as 200 ft. from control unit. Response time varies from 1 to 3.5 sec. according to change in light transmission required to actuate relay. Meter and relay are damped to prevent random operation due to smoke puffs, or other transient light conditions. Power supply is 115/230v., 50/60 cycles.—*Photoswitch Div., Electronics Corp. of America, 77 Broadway, Cambridge 42, Mass.*

Circle 135B on Reader Service Card



Totally Enclosed Motors Withstand Dirt, Fumes

Recommended for use in dusty or mist-laden atmospheres is a rerated line of totally enclosed, fan-cooled motors available in sizes from 7½ to 100 hp.

Designated TEFC, units meet all NEMA requirements and have rib-type cast-iron frame construction for easy cleaning. In addition, the ventilating fan provides same cooling efficiency regardless of direction of motor rotation, and fans do not have to be changed. Insulation for stator windings comprises newly developed plastics and rotor is balanced electronically.—*Century Electric Co., 1806 Pine St., St. Louis.*

Circle 135C on Reader Service Card

Provides Greater Load Space, Easier Maintenance

Interior width of this delivery body, which mounts on a new forward-control stripped chassis, has been increased to 74 in. to provide load space of 365 cu. ft. Driver's compartment has also been increased for greater working convenience and visibility.

Front design of these bodies (Merchandiser) reportedly effects weight savings and provides easy repairability and replacement of parts. Engine accessiblity is improved through use of large radiator access door, removable grill panel, and removable engine cover and floor plates inside the cab. Also, greater use is made of high-tensile steel for maximum strength and durability.

Available as optional equipment are aluminum interior and exterior

another great advance in economy for BULK MATERIAL shippers!

TOTE* SYSTEM

now offers the NEW, TESTED Container Car

Permits rail shipments of bulk materials without freight costs on forwarding and return of Tote Containers.

This car was recently introduced by Shippers Car Line Corporation of New York City and Tote System, Inc. Twenty-eight Tote containers are securely shored in place on the car. Upon arrival at destination, the shoring bars swing easily out of place for unloading. One man can completely unload the car in 35 minutes using a battery powered walkie-type lift truck.

LOAD IT

TRANSPORT IT

DISCHARGE IT

here's how this MODERN COMPLETE BULK HANDLING SYSTEM saves you money!

Tote System is a **complete** bulk material handling system built around sturdy aluminum containers, plus automatic filling and discharging equipment. It is now being used by hundreds of manufacturers and processors for inter-plant shipment of bulk materials; for in-plant storage and handling; and for accurate and automatic weighing, mixing and blending.

Tote System SAVES time and labor . . . container costs . . . losses due to contamination and deterioration . . . losses due to breakage, spillage and sifting . . . losses due to rodents, insects and weather. Tote System also SAVES investment in expensive fixed storage and conveying equipment. Its flexibility and adaptability to changes in plant layout are unmatched.

and now, with the new CONTAINER CAR

It is possible to make long haul shipments of bulk materials in unit containers without any freight costs on the containers themselves . . . to make mixed or split shipments of various bulk materials . . . to simplify shipments to off-rail users.

Tote System engineers are available to help you fit these developments to your specific application. Write at once without obligation.

*Tote and Tote System Reg. U. S. Pat. Off.

TOTE SYSTEM, incorporated

690 So. 7th

Beatrice, Nebraska

sheets. Complete refrigeration installations include choice of hold-over system, having plates and compressor (Kold-Hold), plates and ammonia make and brake valves (Kold-Hold), or a constant-operating hermetically sealed unit (York).

Interior dimensions: 120 in. long x 74 in. wide x 71 in. high.—*Boyertown Auto Body Works, Boyertown, Pa.*

Circle 135D on Reader Service Card

Nest-Type Plastic Pallet Cuts Operating Costs

Designed to lower materials-handling costs is a new nesting-type pallet molded of polyester resins (Bakelite) reinforced wih Fiberglas.

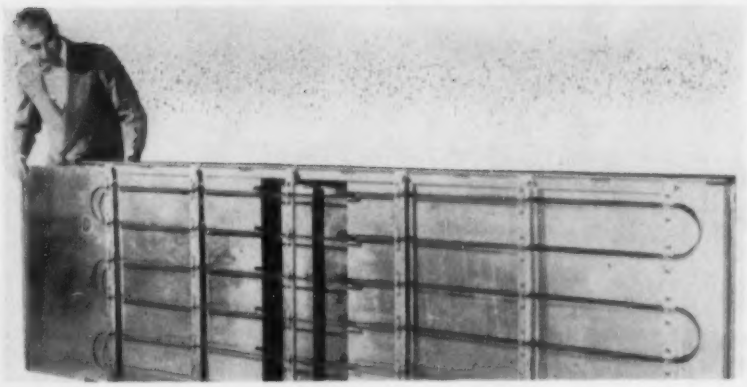
Weighing only 28 lb., unit supports a load of 3,000 lb. and offers resistance to wear and corrosion. Furthermore, it is easily kept clean by steam-sterilization up to 325 F.

Molding the pallet of reinforced plastic eliminates need for nails or fasteners which may loosen and damage a cargo. Nine hollow legs, molded in one piece with the platform they support, are spaced to allow a four-way approach for fork lift trucks. Nested together, 100 of these pallets stack up to a height of 7½ ft., and occupy 102 cu. ft. of storage space.

Plastic's strength reportedly limits deflection even on an overload of 5,000 lb. with the pallet supported on forks. Moreover, nesting two pallets together nearly doubles the strength, which eliminates need for heavy-duty units. Flexibility and resilience permits rough handling without cracking and splintering, while strength increases at low temperature.

A range of colors is available. These are molded into the pallet to prevent scratching or rubbing off. Thus pallet color can be used to identify different cargoes and help prevent accidental loss.—*Firmaline Products, Inc., Midland Park, N. J.*

Circle 137A on Reader Service Card



Radiant Panel Supplies Efficient Process Heat

Operating temperatures up to 600 F. are provided by this waterproof and rustproof electric radiant panel for smoking of ham, bacon, and sausage, and other applications where periodic washdowns are mandatory.

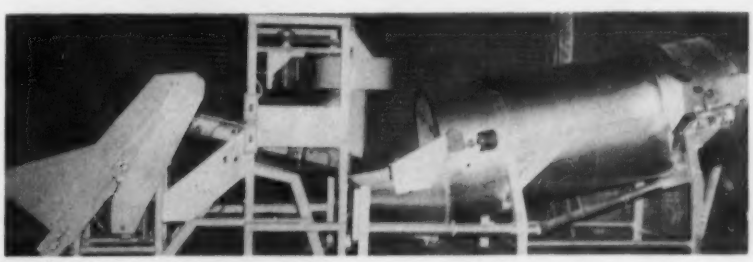
Each panel (Chromalox) measuring 9½ ft. long x 37½ in. high, is made of aluminum and Monel with six ¾-in. dia. immersion-type tubular heating elements mounted lengthwise on 6-in. or closer centers. Each half of the two-piece aluminum reflector may be quickly removed for cleaning.

Thermal shock-proof tubular elements connect to a sealed and leak-proof aluminum terminal housing in rear of unit, which enables assembly to withstand repeated washdown with water, detergants, and industrial solvents. And severe acid or corrosive conditions can be met with special resistance alloy construction.

Design flexibility permits easy assembly into side or overhead tunnel mounting in automatic conveyor installations. Working temperatures are controlled by speed of conveyor, distance from panel, and by adjustment of element temperature through a manually-set, automatic electric input timer. Temperature remains constant for any given setting, and automatic controls are available to suit number of units required.

Panels can be supplied with other element arrangements in any watt density up to 2.7 kw. per sq. ft. or 80 kw. per unit, and for all commercial voltages.—*Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh, 8.*

Circle 137B on Reader Service Card



Package Unit Dry-Cleans, Washes Green Beans

Efficient operation is reported for a new bean cleaner and washer. Unit removes leaves, stems, small stones, and soil, then washes stringless green and wax beans before snipping. Capacity, which varies with condition of beans, is about 4½ tons per hr. based on a 40-sec. wash.

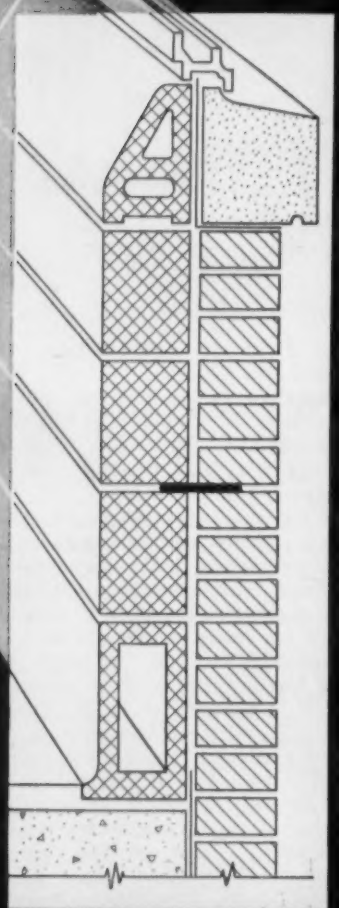
Assembly can be used as a unit or separately. Cleaner comprises a 2-step shaker screen with elevator, and a fan with double-suction legs located over the fall between screen's first and second step, and at the discharge. Washer consists of a rotating open-end drum mouted on trunions in an inclined tank, feed end of which extends horizontally to form a hopper. Drum has a spiral, and agitator paddles between spiral leads.

In operation, beans are carried up on a cleated belt to a shaker screen which removes foreign matter. In falling from first to second step of shaker screen, they pass through a current of air being pulled by the first suction

economical "wall-and-finish-in-one"

STARK

glazed facing tile



No wonder this versatile material is currently in such great demand!

It builds a sound structural wall and a permanent, colorful ceramic finish at the same time—saves construction time and maintenance money.

And you can be sure that Stark Glazed Facing Tile will stand up under heavy usage—it's a quality product, backed by more than 40 years of manufacturing experience.

To obtain the quantities and colors you need for your next job, advise your contractor to order promptly—an early order is your assurance of timely delivery. There is no reason to accept a substitute.

NEW CATALOG showing shapes, sizes, accurate colors, is available to you free.

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Canton 1, Ohio

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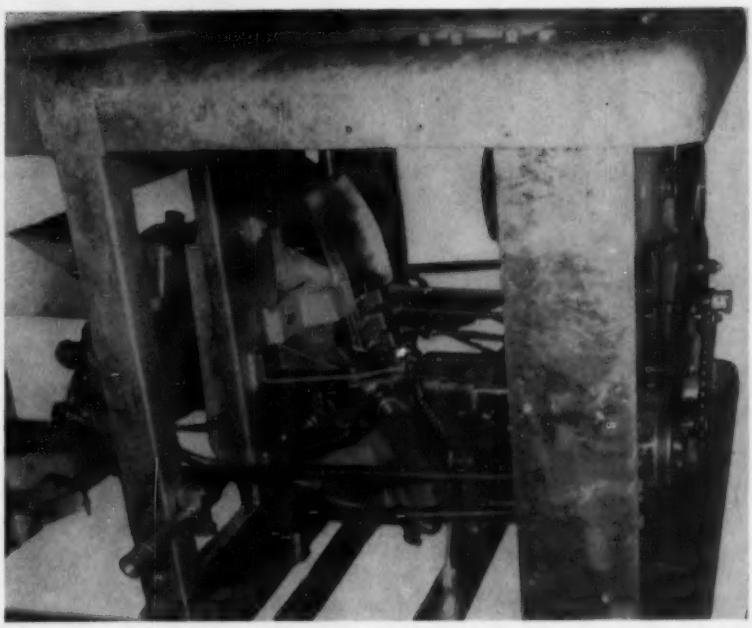
FTI STRUCTURAL

leg of the fan. Cleaning is repeated on the second step screen and beans again fall through a current of air pulled by the second suction leg, then discharge into washer.

Beans then fall into a water bath where they are moved forward by a paddle wheel, to be picked up by spiral in drum moving them forward and upward to discharge end. Here, they get a fresh water spray for final washing. Drum is inclined to gain discharge height and to recirculate water without a pump. Last section of drum (housing fresh water sprays) is made of perforated metal for drainage. Water is caught in a basin and returned to feed-end tank of washer, which has a sand and dirt trap, and a 4-in. quick-opening flushout valve.

Unit's approximate overall dimensions: 24 x 6 x 7 ft.—*Chisholm-Ryder Co., Niagara Falls, N. Y.*

Circle 137C on Reader Service Card



Versatile Unit Protects Fish During Scaling

Uniformly distributed pressure, applied to fish during scaling in this automatic unit, is said to prevent cutting or breakdown of flesh structure.

Versatile scaler has a capacity of 5,000 to 9,000 lbs. per hr., depending upon fish size and type, and automatically adjusts for sizes from ½ to 9 lb. Thus, a ½-lb. fish can follow a 9-pounder and vice-versa. Machine is constructed of non-corrosive metals and motor has sealed bearings.

As fish enter unit, retarders automatically adjust for different size to hold them firmly during scaling. Scalers are driven by six flexible shafts (Stow Mfg. Co., Binghamton, N. Y.) which provide the automatic adjustment.—*General Fish Scaling Machine Co., Inc., 105 Foundry St., Wakefield, Mass.*

Circle 139B on Reader Service Card

New Precision Balance Speeds Lab Weighings

Accuracy and simplicity are advantages cited for a new laboratory balance designed to speed up weighing.

Designated Model LA-3, unit has torsion bands made of a strong corrosion-resistant alloy for long service life. A single beam with vernier permits accurate weighings from 0.01 to 10g. without use of loose weights. To minimize vibration effects, the stainless steel calibrated beam assembly is placed directly over the torsion mechanism, and an oil damper reduces balance oscillation.

Capacity is 200g., while sensitivity reciprocal (amount of weight required to change rest position of indicator one full scale division) is 0.02g. Equipped with a 5-in. removable stainless steel weighing pan, unit's shipping weight is 11 lb.—*Torsion Balance Co., Clifton, N. J.*

Circle 139A on Reader Service Card

High-Capacity Unit Speeds Bulk-Material Handling

Designed for increased handling efficiency is a new four-wheel-drive tractor-shovel called Payloader HO. Capacity is 2 cu. yd.

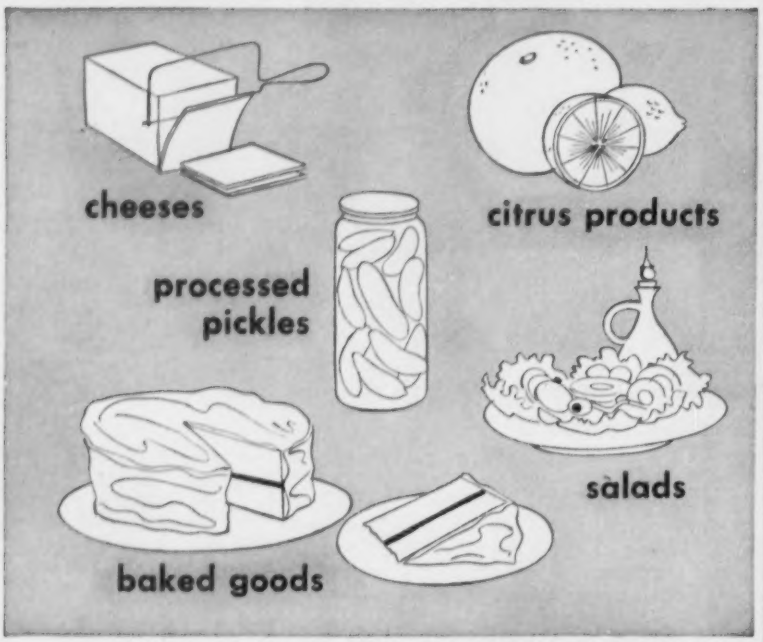
To speed and simplify operation, unit employs a "power-shift" transmission that eliminates use of a clutch pedal. With this arrangement, all shifts through all speed ranges in both forward and reverse can be made without stopping or even slowing down. And for driver comfort, shovel has adjustable seat with molded cushions in one-piece frame.

Machine's construction permits close cradling of the load, which together with a long wheelbase, provides maximum stability. Underslung de-

CARBIDE is the source for

SORBIC*

*a **NEW** selective food fungistat for . . .*



- Sorbic can be used with confidence at required levels—it is metabolized like fatty acids in foods.
- Sorbic controls growth of many undesirable microorganisms in foods.
- Sorbic can be so used that it permits the growth of many of the desirable organisms.
- Sorbic contributes no flavor at required concentrations in foods so far tested.

For further information write the CARBIDE office nearest you for technical bulletin F-6568. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal and Toronto.

* CARBIDE's *refined sorbic acid for use in foods.*

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Equipment & Supplies

sign and position of the boom-arm permit better visibility and eliminate need for safety guards to protect driver during raising and lowering operations. In addition, unit is said to have greater than average lifting and dumping height, and is available with gasoline or diesel power.

Components include: Sealed, pressure-controlled hydraulic system; 12v. battery on gas-powered model with battery box and hydraulic-oil reservoir mounted behind driver's seat for accessibility; torque converter; double-acting hydraulic rams with chrome-plated piston rods; vacuum-boosted, four-wheel hydraulic brakes, and power steering. A loadshock accumulator device is optional. — *Frank G. Hough Co., 835 Seventh St., Libertyville, Ill.*

Circle 139C on Reader Service Card

Truck Refrigerator Units Fit Many Requirements

Designed for fully automatic on-the-road and stand-by truck refrigeration, in temperature ranges from 32 to 50 F., is a new line of dual-control, two-compressor systems.

They consist of an engine-mounted compressor driven by a belt from engine drive shaft, an electric stand-by unit mounted over the cab, and a choice of a 2-hr. hold-over plate blower with high-capacity fan or a

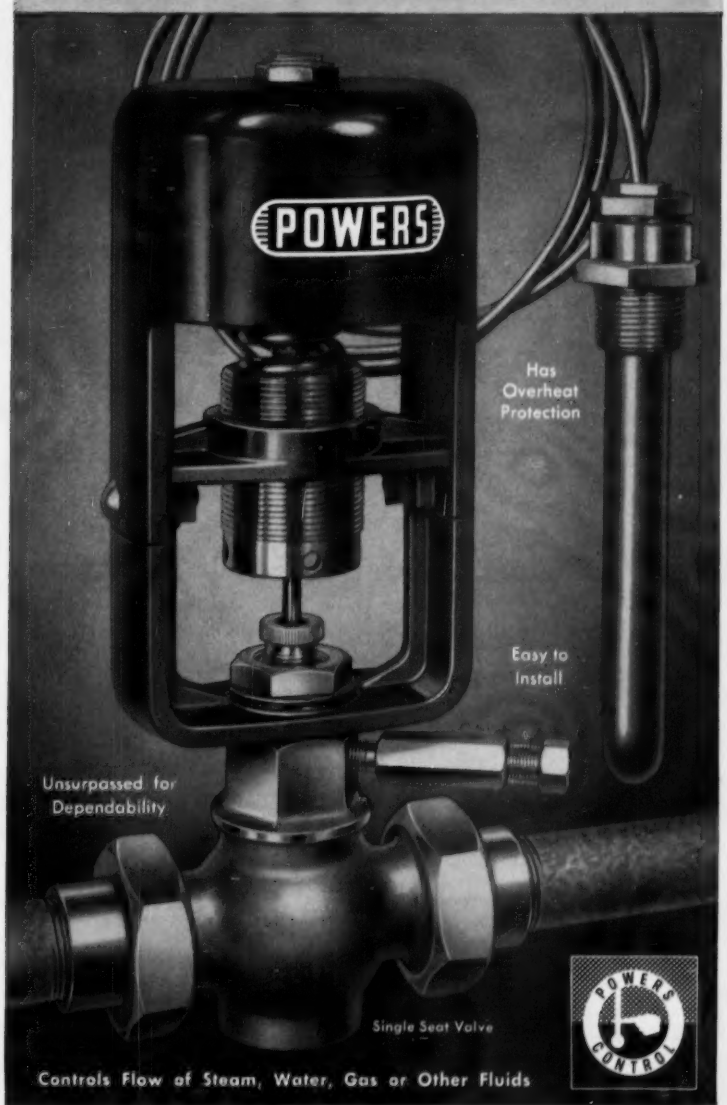
Want More Information?

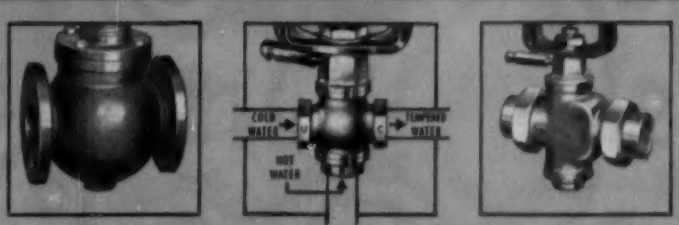
It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—back of book. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

POWERS No. 11 Self-Operating TEMPERATURE REGULATOR

Automatically holds temperature constant at the right point. Prevents losses caused by wasteful OVER-heating.

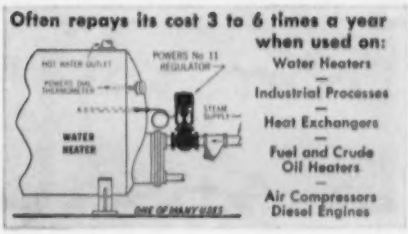




Various Valve Bodies and Inner Valves are available. Single and Double Seat Valves thru 2" have rugged bronze bodies with bronze union connections for quick, easy installation. Bulletin 329 gives information about all types.

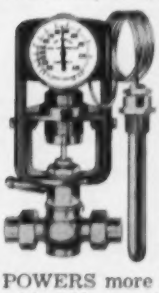
(o88)

Why It Gives BETTER CONTROL and Saves More Money



ONLY POWERS No. 11 REGULATOR Offers ALL These Advantages

- **Simple, sturdy construction.** Materials used are corrosion resistant.
- **Powers bellows has 50% more power** than used in the majority of regulators. The heart of a self operating regulator is its bellows. Powers with its 50% greater effective area gives better control and its durable 2 ply bellows outlasts ordinary single ply bellows.
- **Valve stem lubricator** with silicone grease aids easy movement of highly polished stainless steel valve stem and reduces drying out of packing.
- **BETTER CONTROL** results from Powers powerful bellows and minimum of valve stem friction.
- **60°F. temperature ranges** available with accuracy of ±1°F. on some processes and 2 to 3°F. on others.
- **Rugged bronze valve bodies with bronze union connections,** for single and double seat valves thru 2", reduce installation time and labor. Larger sizes have flanged iron body valves.
- **Powers Nationwide Service and 24 Hour Delivery** in the U.S.A. are important time and money saving advantages.



- **Indicating Regulator** with easy to read 4" dial thermometer helps adjust the regulator and check temperature at the bulb. Various dials and ranges are available.

Right type and size of valve is important for good control. May we help you make the right selection? Benefit from POWERS more than 60 years experience with self-operating regulators.

Call our nearest office or write us direct for Bulletin 329.

THE POWERS REGULATOR CO.

Skokie, Ill. | Offices in Chief Cities in U.S.A.
Canada and Mexico | See your phone book

Automatic Temperature and Humidity Control

Established 1891

For more information, use coupon on last page.

Although almost every kind of food plant can use ideas from the big Bakery Show in Atlantic City Oct. 1–6, most food plants will depend on FE's November issue for a full report on equipment and supplies exhibited. The only magazine bringing you full new-equipment reports from all the major shows in the food industry is

Visit us at Booth 1353!

FOOD ENGINEERING

McGraw-Hill ABC ABP

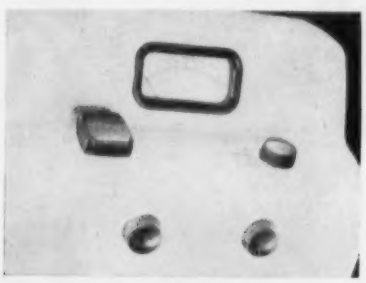
blower-evaporator with multi-vane fans.

System U.O.C. 104-5 with hold-over plate blower is recommended for center city deliveries with multiple stops and many door openings. Model U.O.C. 105-5 with blower evaporator, is offered for suburban wholesale or intermittent delivery stops. Both are powered by a 4-cylinder, V-type compressor which is designed for heavy-duty truck refrigeration and continuous high-speed operation.

In addition to the two-compressor systems, there is a Model U.O.C. 101-5 comprising a standard engine-mounted compressor, a blower evaporator, and a condenser-receiver assembly mounted over the cab. This equipment refrigerates only when engine is running and is intended for over-the-road wholesale deliveries.

A fourth system (Model U.O.C. 100-5), a standard electric-standby unit for over-the-cab mounting, is used with 8-10 hr. hold-over plates. It recharges plates only when plugged into commercial electric power.—*Lehigh Mfg. Co., Lancaster, Pa.*

Circle 140A on Reader Service Card



Easy-to-Use Colorimeter Serves Two Purposes

Accuracy, simplicity, and speed of operation are advantages reported for a dual-purpose analytical instrument designed for work in colorimetry and spectrophotometry.

Known as Spectronic 20, unit employs a printed amplifier circuit to eliminate wiring and soldering problems. Furthermore, "plug-in" design enables economical replacement of complete circuit as a unit. Tubes are standard and available from local supply sources.

In colorimetry, readings of optical density or percent transmittance are taken direct from the scale. Straighter, steeper plots reportedly are obtained, where Beer's law applies, because of narrow band pass and absence of stray light.

In spectrophotometry, a precision diffraction grating pin-points absorp-

Weight Indication by a Beam of Light Assures Fast, More Accurate Readings

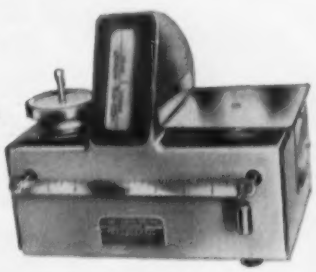
SHADOGRAPH Scales are precision weighing instruments designed to weigh food products for batching, processing, canning and packaging. Their shado-edge indication is easy to read, eliminates errors and guess work, prevents loss of product through overweight.

Shado-edge indication is projected by a beam of light—parallax readings are impossible. Friction of indicating mechanism is eliminated and greater speed achieved through reduction of lever fall and an adjustable damping device which brings indicator to rest quickly.

SHADOGRAPH
Scales available in a number of models. Capacities from 2 grams up to 75 lbs.

(Above)
MODEL 4104

(Right)
MODEL 4204



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Exact Weight Scales
Better quality control
Better cost control

THE EXACT WEIGHT SCALE COMPANY

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Send full details on ( ) Model 4104 ( ) 4204

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Address .....

City ..... Zone .... State .....

For more information, use coupon on last page.

Exposes foreign matter and residue! Resists oils, acids, alkalies!

Globe White Neoprene Rubber Belting installed on loading make conveyor.

EXPOSED: Dust, dirt and other accumulations! Product particles that are left behind!

The snowy whiteness of Globe White Neoprene Belting exposes them all to certain detection, enabling immediate elimination with hot water or live steam. *That's sanitation-plus!*

Known as the do-all conveyor belting of the food industry, for which it was specifically developed, Globe White Neoprene Rubber Belting consists of multiple layers of hard-woven, light duck, molded together with highest grade neoprene rubber between the plies and over the entire surface . . . finished with a 3/64" thick, satin-smooth cover on the carrying side and with a friction surface on the pulley side.

The characteristics of this type of construction are unmatched: Exceptional flexibility; high tensile strength; minimum stretch . . . all extremely advantageous in operations where head and tail pulleys are small, and on machines with limited take-up facilities.

Resistant to oil, grease, acids, alkalies — possessing a satiny smoothness that makes no impression whatsoever on the product conveyed, Globe White Neoprene Rubber Belting is today on the "must" list of numerous food processing and handling concerns.

Also available in Black. Ask about Globe White Ruff Top Neoprene Incline Belting, Globe Brown Neoprene Belting, with friction surface on both sides, and Globe Brown Kling-Top Neoprene Belting, with non-slip top for incline and decline.

Write Dept. E for free samples, literature and the name of your local distributor.

GLOBE WOVEN BELTING CO., INC.
1400 CLINTON STREET • BUFFALO 6, NEW YORK
KNOWN FOR QUALITY THE WORLD OVER

Equipment & Supplies

tion measurements between quickly selected settings of wavelength selector knob. Having 600 grooves per mm., this grating eliminates filters throughout the 375-650 mμ range, and to 950 mμ with a quick change of phototube and supplementary infrared transmitting filter.

Operator turns knob and "tunes in" monochromatic light of high spectral purity. No adjustment of slit width for sensitivity control is necessary, since dispersion of grating is linear and output is constant.—*Bausch & Lomb Optical Co., Rochester, N. Y.*

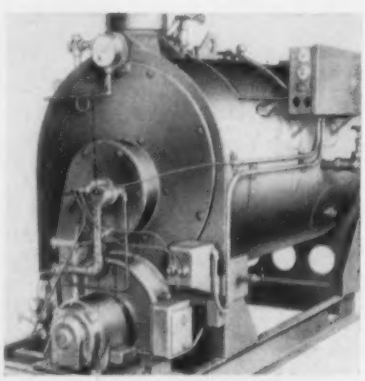
Circle 143A on Reader Service Card

New Plastic Covering Protects Equipment

Strength, light weight, and durability are advantages reported for a protective covering (Herculite) made of nylon and vinyl plastics.

Food applications include covering of equipment such as kraut fermenting tanks, cheese vats, storage bins, and trucks. Material is electrically welded to sustain high stress in use. This procedure, rather than sowing, is said to make the fabric completely waterproof. In addition, it does not burn, fade, shrink, or stretch, and is resistant to salts, rot, and mildew.—*Fellowcraft Engineering, Inc., 270 Jelliff Ave., Newark 8, N. J.*

Circle 144A on Reader Service Card



Efficient Package Boiler Has Space-Saver Design

A compact 40-hp. steam generator (83¼ in. long, 57¾ in. high, and 36½ in. wide at the skids) incorporates improvements and safety devices designed to protect the boiler, insure trouble-free operation, and maintain an efficiency of 80% or better.

Burning oil, gas, or a combination of oil and gas, unit (Cyclotherm) is

YOUR SALES START ROLLING HERE

Top quality printing reproduction *is the key to sales success, because a sparkling, outstanding wrapper will build the sale of your product.*

Western Waxed has the finest, most modern, and widest range of printing equipment—rotogravure, letterpress and flexographic. This means that we can offer you the best printing reproduction in the process most suited to your needs, to give you the brightest, most appealing package.

another reason why Western Waxed packaging materials are the best

WESTERN WAXED PAPER

DIVISION CROWN ZELLERBACH CORPORATION

This "MICROSIEVE" is a perfect roadblock that guards the quality of many fine foods

No unwanted solids can pass this Dicalite filtercake—yet you get high throughput for full production. The reason is simple: only 10% of the filtercake is solid; 90% is voids, voids so tiny that even particles down in the colloidal and bacterial range can't get through. Decolorizing clays and activated carbon are caught and held; every trace of catalyst is removed from hydrogenated oils and fats.

For brilliant clarity and purity of filtered liquids; for greater stability of finished product; for lower filtering costs; Dicalite Filteraids have no superior. Impartial laboratory tests and the experience of many food processors support this statement. Dicalite Filteraids are produced from the nation's highest-grade deposits of diatomite and are processed under strict quality controls to set a new high standard of excellence in diatomaceous filteraids.

For more complete data on filtration, write for Bulletin B-12.

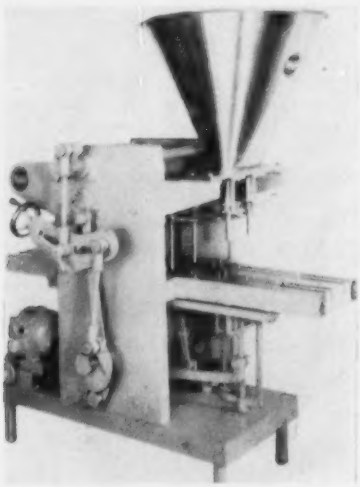
Dependable GREAT LAKES **Dicalite®** DIATOMACEOUS MATERIALS

DICALITE DIVISION, GREAT LAKES CARBON CORPORATION, 612 SOUTH FLOWER ST., LOS ANGELES 17, CALIFORNIA

rated at 1,380 lb. of steam per hour (1,340,000 Btu.). Pressures range from 15 to 200 psi. Automatic operation is controlled electronically. And all controls are located in a single box, mounted at eye level on the boiler shelf for ease of maintenance.

Shipped from the factory pre-tested and ready to cut in on the line, boiler can be installed wherever fuel, water, and electricity are supplied, and requires no special foundation or stack. —*Cyclotherm Div. National, U.S. Radiator Corp., Oswego 6, N. Y.*

Circle 144B on Reader Service Card



Product Versatility Cited For Heavy-Duty Filler

Quick and accurate filling of items such as mayonnaise, sundae toppings, and peanut butter is reported for a heavy-duty unit with range of fill up to 1 gal.

Called Type 19S, machine employs fabricated steel construction throughout, and ball bearings on all main shafts. It is equipped with "no container-no fill" unit, removable feed bars, and stainless steel table plates.

In addition, the unit offers: Quick changeover for quantity and containers without repositioning of pistons or other parts, nozzles for dripless bottom-up fill, and special hoppers for agitation.—*Hope Machine Co., 9400 State Rd., Philadelphia, 14.*

Circle 147A on Reader Service Card

Food Moisture Measured With Electronic Meter

Fast and accurate measurement of moisture in a variety of foods is reported with use of an electronic meter

UNITED BB CORKBOARD (BLOCK BAKED) Patented

WORKS AS EASILY AS LUMBER!

SAW IT... United Corkboard can be trimmed, sawed, nailed just like lumber . . . without splinters or irritating dust.

BEND IT... United Corkboard is flexible. The big, straight-edged slabs fit snugly, take fewer joints. Corners and irregular construction are easy too.

SELF-SUPPORTING... United Corkboard provides structure, framing and insulation all in one . . . requires no internal supports . . . can even be used in self-supporting partitions.

LOW "K" FACTOR... United Corkboard properly installed retains its insulation value for the life of the installation . . . provides a time-tested material for low temperature service.

BONDS TIGHTLY... United Corkboard installs easily with hot or cold asphalt, or other common adhesives. Won't pack down. Resists dampness and formation of moisture carrying channels.

DEMAND UNITED CORKBOARD... for the finest in easy-handling, lightweight, superior-strength insulation. Insure an installation that goes up quickly and easily . . . without added fillers or binders. United Corkboard will not rot, swell, warp or support bacterial growth. It's fire-retardant, insect and vermin-proof.

FROM ENGINEERING DESIGN TO FINAL INSTALLATION

Our branch offices provide complete services. Trained engineers are available for consultation . . . or will design every detail of your job. Skilled work crews will erect your installation quickly and efficiently. Almost fifty years of service to the refrigeration industry is your assurance of satisfaction.

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UNITED CORK COMPANIES

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Manufacturers and erectors of cork insulation for almost a half century

Engineering and installation offices, or approved distributors, in key cities — coast to coast.

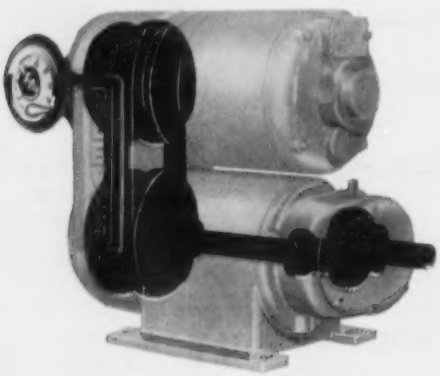
REEVES

the right speed for every need!

fractional HP Vari-Speed
MOTODRIVE

compact, attractive design

Within streamlined, metallic blue housing is REEVES' "weatherized" motor, time-tested speed changing mechanism, and heat-treated helical gear speed reducer. Maximum space for vertical model only 16 5/16" x 21½" x 11½". Other models equally compact.



simple, accurate operation

14-turn handwheel on Speedial indicator gives you stepless, accurate speeds from 3 to 4660 rpm's—within a 2:1 to 10:1 speed range. Electric remote or automatic controls also available.

versatile application

Select your *exact* needs from 112 assemblies: ¼, ½ or ¾ hp. units; horizontal left or right, vertical, or 45° left or right models; horizontal or vertical down output shaft.

Write Dept. FE19-M543 for complete bulletin.

REEVES PULLEY COMPANY • Columbus, Indiana
Division of RELIANCE Electric and Engineering Co.

Equipment & Supplies

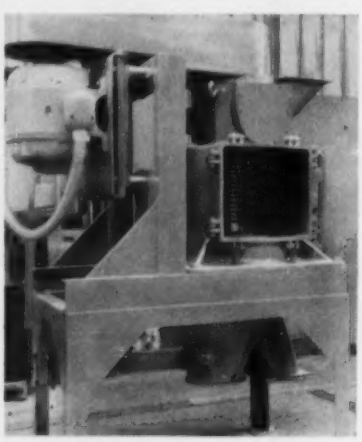
designed for production-line or laboratory control.

Unit measures moisture content of flour over the range 9.5-23.9%. Other products handled include bread crumbs, chocolate crumb, nuts, macaroni, gluten flour and wheat starch. It is not suitable, however, for use with cheese, preserves, or substances containing excess free moisture.

Accuracy is within 0.5%. But where a specific item is to be handled frequently, an accuracy of 0.2% can be achieved by correlating instrument readings with results of oven checks. Operation requires no preliminary weighing, while errors due to temperature are termed negligible.

An accurate result may be obtained in less than 1 min. by unskilled operators, who quickly can be instructed in the use of the instrument. Latter is portable and available with a.c. line converter or batteries.—*Marconi Instruments, Ltd., 44 New St., New York City.*

Circle 1478 on Reader Service Card

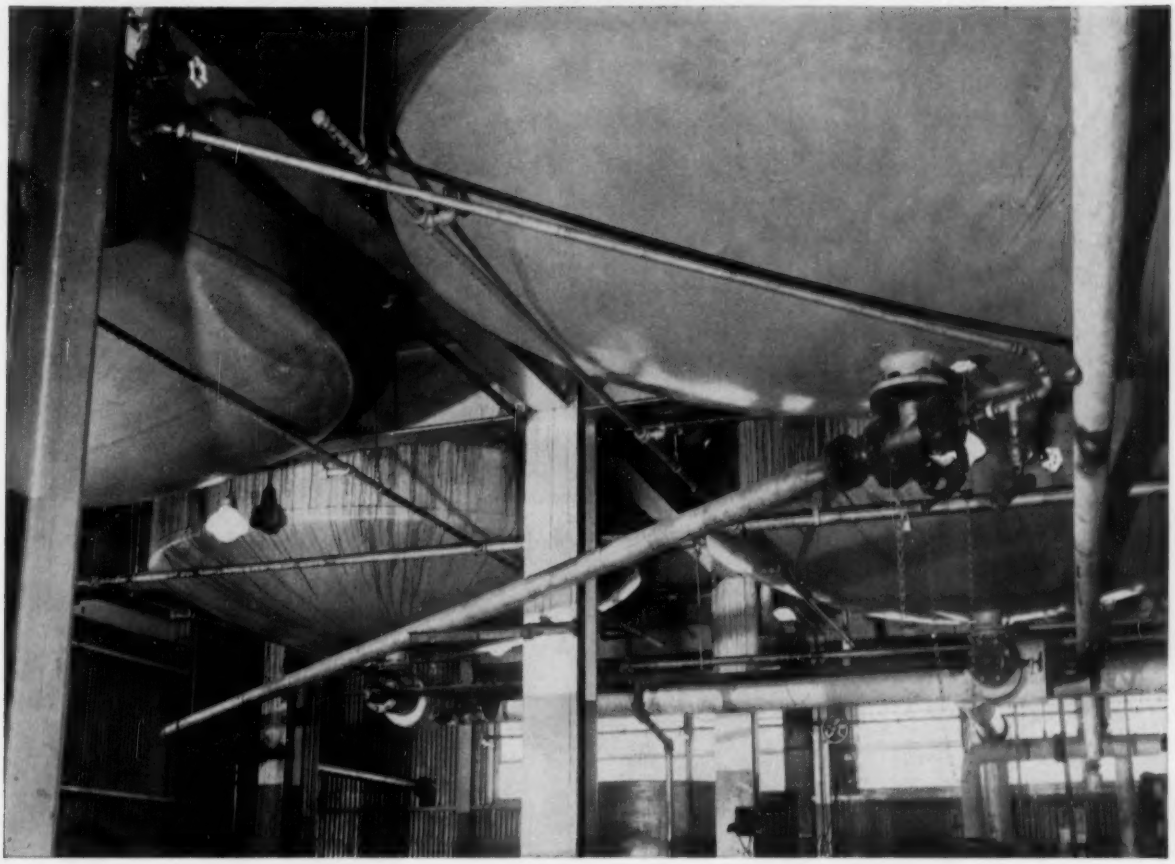


Redesigned Disintegrator Has Wider Application

Changes in design and operation incorporated into a new line of disintegrators reportedly widen its application to continuous grinding, mixing, and size reduction. Illustrated model has an 18-in. dia. rotor.

A side-mounted, belt-driven motor gives the unit (Disintegrator) variable-speed operation from 1,200 to 5,000 rpm. Employed are 3,600-rpm. motors (30 to 125 hp.) with two sets of belts and four pulleys. This combination allows six speed ranges with changeover time reported to be less than 30 min.

Machine can be fed from one or two directions over a 90-deg. quadrant. For easier feeding, it is fitted



Sugar Refinery cuts process line costs with *Carpenter* Stainless Pipe

Two or three piping breakdowns a year due to corrosion and low temperatures were common before a sugar refinery switched to Carpenter Stainless Pipe for process lines handling liquid sugar. To date, the Carpenter Stainless Pipe has given 4 times the service life of the piping formerly used, with no signs of requiring replacement.

The high strength-weight ratio of stainless permitted using lighter walled pipe which cut fabricating time and cost considerably, and increased flow capacity of the lines. Other advantages the refinery gained include superior sanitation, resistance to corrosive attack at temperatures up to 200°F, abrasion resistance, and substantial savings in replacement down-time and costs.

Perhaps these advantages can help you cut costs and improve product quality. Call your nearest Carpenter Distributor or Branch Office for help and guidance . . . ask for Bulletin T. D. 114.

MEMBER

The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

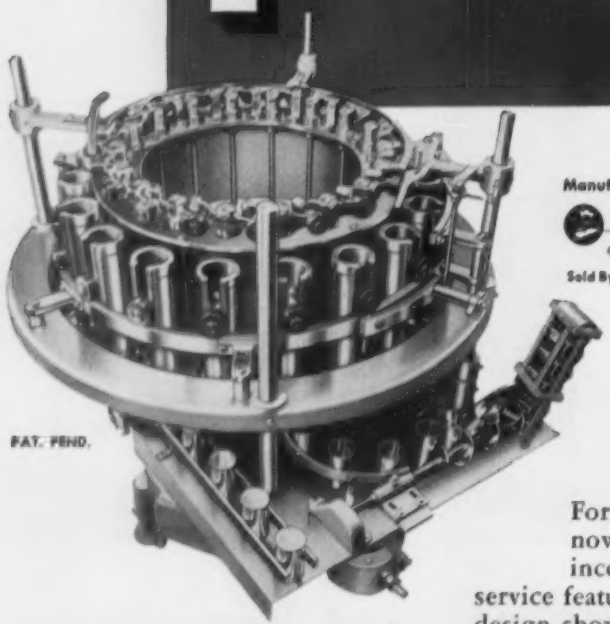
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

Stainless Tubing & Pipe

For more information, use coupon on last page.

VALVE DESIGN OF NEW *Librascope Filler* 4 WAYS BETTER

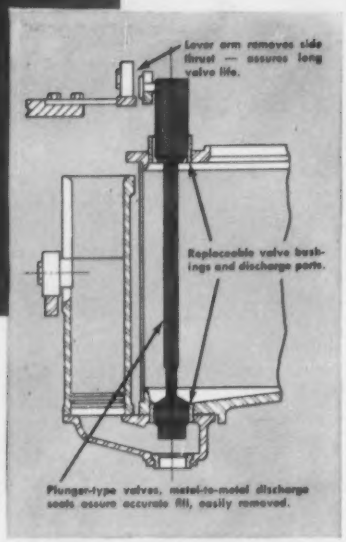


PAT. PEND.

Manufactured by

LIBRASCOPE INC.

Sold By W. F. & John Barnes


Lever arm removes side thrust — assures long valve life.
Replaceable valve bushings and discharge ports.
Plunger-type valves, metal-to-metal discharge seats assure accurate fill, easily removed.

Cross-section drawing of valve and piston assembly of the Top Fill, Model P Filler. Handles such products as Juice Concentrates, Tomato Paste, Dog Foods, Apple Sauce, and Oils.

For liquids and semi-solids, W. F. & John Barnes now offers the canning industry a new Filler that incorporates many outstanding maintenance and service features. For example, the new plunger-type valve design shown in drawing above, offers 4 distinct advantages — (1) more positive closure against leakage of product; (2) correct amount of fill, including the very first containers through the machine; (3) clean discharge ports after each filling cycle, and (4) longer valve life.

OTHER PROFIT MAKING FEATURES

● **FAST, ACCURATE FILLING** — Up to 800 containers per minute. New valve design, precision machined pistons assure accurate measurement.

● **SURGICAL CLEANLINESS** — All product contact parts 316 stainless steel or non-copper alloy. Removable one-piece, lift-out valves and pistons assure fast, thorough cleaning.

● **FLAT TOP CAM, LARGE DIAMETER PISTON ROLLERS** — Insure accuracy of fill, prevent skidding and wearing flat spots on rollers.

● **UPRIGHT PISTON HEAD DESIGN** — Pistons enter upright cylinders from top, receiving product from bottom. Closed lower end of cylinders guards against leakage.

● **LARGE TURNING RADIUS** — Cylinders arranged on large turning radius permit a more gradual piston rise, reducing side thrust and rate of wear.

HIGH OUTPUT—LOWER MAINTENANCE COSTS

You'll find the new Librascope Filler gives you all of the refinements of accepted and proven practices in addition to the many other new and improved operating features outlined at left. Lower maintenance cost, combined with high output capacity, are features that will save you time and help reduce processing costs.

WRITE FOR FREE DATA — Write today for additional information on the Model G — Gravity, Model GP — Gravity Pocket, Model P — Piston, or Model PB — Bottom Fill Piston Librascope Fillers. Available with 6, 9, 12, 18, or 27 stations to meet your production requirements.

EXCLUSIVE SALES REPRESENTATIVE **W. F. & JOHN BARNES COMPANY**
407 SOUTH WATER STREET • ROCKFORD, ILLINOIS

W. F. & JOHN BARNES

Aseptic Canning Equipment

Retort Basket Loaders and Unloaders

Empty Glass Single Filers

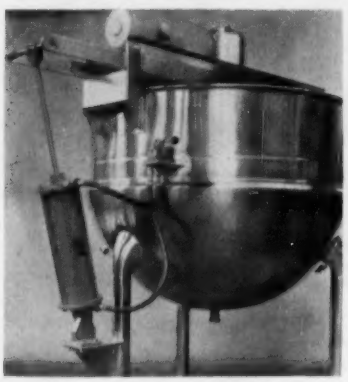
BUILDERS OF BETTER MACHINERY AND EQUIPMENT SINCE 1872

on one or two sides with a hanger bearing for mounting of screw conveyors. Dust-tight and leak-proof operation is offered by heavy plate doors that swing back out of the way. This permits easy access to machine's interior for cleaning or changing of screens.

Unit is further designed to minimize vibration, which makes bolting to the floor unnecessary and simplifies installation. Side-mounted motor reduces over-all height, lowers center of gravity, and eases belt changing and aligning. For added safety, belts and pulleys are enclosed by a quickly removable solid belt guard.

Models are available with carbon or stainless steel rotors and hammers, or with any combination of carbon and stainless.—*Rietz Mfg. Co., Santa Rosa, Calif.*

Circle 148A on Reader Service Card



Agitator Easily Tilted With Hydraulic Lift

An operator may easily and safely raise or lower a kettle's agitator with use of this hydraulic lift.

Designed as optional equipment for maker's kettles (Mix Cooker), its use enables agitators to be quickly tilted out of standard kettles for cleaning, or to avoid obstructing flow

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CUT COOLING TIME

RAISE PROCESS QUALITY

with

C. H. WHEELER VACUUM REFRIGERATION

Employing the principle of flash evaporation, here's what C. H. Wheeler Steam Jet Vacuum Refrigeration will give you in food processing:

Low initial cost of equipment in standard assemblies consisting of steam jet ejectors, boosters, barometric or surface condensers and water pumps • Low installation cost • Low cost operation using plant steam at pressures down to 2 psi • Savings in space in plant, on roof or outdoors • Savings on maintenance, because there are no moving parts in a steam jet vacuum system except the chilled water pump • Uniform production capacity, because there is no wear or scale formation • Easy operation with either manual or automatic instrument control • Overload capacity without damage • Economical operation at part load • Maximum safety, no noxious gases, no pressure or explosion hazard • No noise or vibration • Cooling to any temperature above 35° F.

TYPICAL ADVANTAGES OF C. H. WHEELER STEAM JET VACUUM REFRIGERATION IN SPECIFIC APPLICATIONS:

LEAFY VEGETABLES

Savings on packaging, shipping and labor.

MEATS

Faster cooling penetrates centers, raises quality, reduces spoilage.

PROCESS-WATER

Recycling conserves water for various plant cooling requirements.

Investigate the possibilities in your plant for C. H. Wheeler Steam Jet Vacuum Refrigeration. Write for Bulletin 1462 and name of nearest representative.

WE.505

C.H. Wheeler

C. H. WHEELER MANUFACTURING CO., 19th & Lehigh, Phila. 32, Pa.

Steam Jet Ejectors • Vacuum Refrigeration • High Vacuum Process Equipment • Steam Condensers, Centrifugal, Axial and Mixed Flow Pumps • Deck Machinery • Marine Condensers, Ejectors and Pumps

RECIPE

FOR AN INSTANT DIETETIC PUDDING
LOW IN CALORIES,
IT LOOKS GOOD, TASTES BETTER, SELLS BEST!

INSTANT DIETETIC CHOCOLATE PUDDING

Dietetic pudding mix for preparing instant-type puddings easily made with MARGEL, specially prepared algin stabilizer for low calorie cold milk puddings.

MARGEL	18.3%
FINE QUALITY DUTCH COCOA	55.2
CALCIUM GLUCONATE USP	12.8
TETRASODIUM PYROPHOSPHATE, ANHYD.	7.4
SALT	3.6
VANILLIN	0.7
SODIUM SUCARYL	1.5
SACCHARIN	0.5
	100.0%

DIRECTIONS Add a one ounce package of the above pudding mix to two cups of milk with stirring.

CALORIC VALUE

Caloric value of MARGEL is about 1.0 calories per gram. Pudding made with this mix and 2 cups of skim milk will provide 4 servings at 59 calories each or 6 servings at 39 calories each. Algin stabilizers reduce or replace starch and sugars, cut calorie content way down!

CHECK

these ALGIN ADVANTAGES in your dietetic syrups, salad dressings and desserts

1) Gives desired viscosity and body.
2) Assures greater stability to emulsions.
3) Prevents separation.
4) Provides a smoother, cleaner emulsion.
5) Easy, quick, and complete solubility.
6) Easy to use in all kinds of dry mixes, dry blends, or paste type products.

For further information on the use of Kelco Algin products in dietetic food formulations, write your nearest Kelco regional office listed below.

120 Broadway, New York 5, N. Y.
20 N. Wacker Drive, Chicago 6, Ill.
530 W. Sixth Street, Los Angeles 14, Calif.
Cable Address: Kelcoalgin—New York

KELCO COMPANY

KELCO REFINED ALGIN PRODUCTS

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Equipment & Supplies

from tilting units. Time is saved as use of chain hoists is eliminated, and simplified design provides easy cleaning and maintenance.

Device operates on a minimum of 40 psi. of water pressure and is controlled by a single lever. Pressure is regulated so that agitator may be stopped at any point and held in position.—*Hamilton Copper & Brass Works, 820 State Ave., Cincinnati.*

Circle 151A on Reader Service Card

Truck Refrigeration Cost Cut by Aluminum Insert

An insulated packaged insert, termed easily installed in new or old vehicles, reportedly cuts refrigerating expense for city milk-delivery trucks.

Known as Dair-rt, it employs two top hold-over plates (Kold-Hold, 30 in. x 58 in. x 2¼ in.) for quick pull-down at night. Driver loads truck after day's work and efficiently insulated unit keeps load cold overnight. During normal winter operations, truck contents may be kept cold up to four days without recharging, according to maker. A magnet block keeps the sliding doors tightly closed.

Insert is vapor-sealed with a protective aluminum-foil coating. Frame, sliding doors, and metal work are all of aluminum, thus eliminating use of wood which tends to rot out. Furthermore, convenient rack arrangement permits systematic loading for route delivery.

Optionally provided is an aluminum tail gate that accommodates about 25 cases of empty bottles. When not in use, it folds up against the truck body, but drops down to receive cases. Truck is loaded and unloaded from cab entrance.—*F. H. Langsenkamp Co., 229 E. South St., Indianapolis 25.*

Circle 152A on Reader Service Card

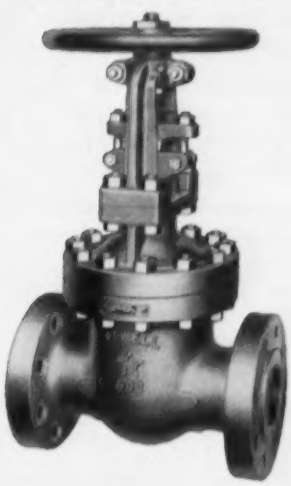
POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES

POWELL VALVES FOR MODERN INDUSTRY

FIG. 2193—Ni-Resist* Gate Valve for 200 Pounds W.O.G.

FIG. 2453 G—Stainless Steel O.S.&Y. Gate Valve for 150 Pounds W.P.

FIG. 6003 SS—Alloy Steel Gate Valve for 600 Pounds W.S.P.



*Trademark of The International Nickel Co.

POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES

When you think of valves—think of Powell. For Powell has a *complete* quality line. Powell probably makes more kinds of valves and has solved more valve problems than any other organization in the world.

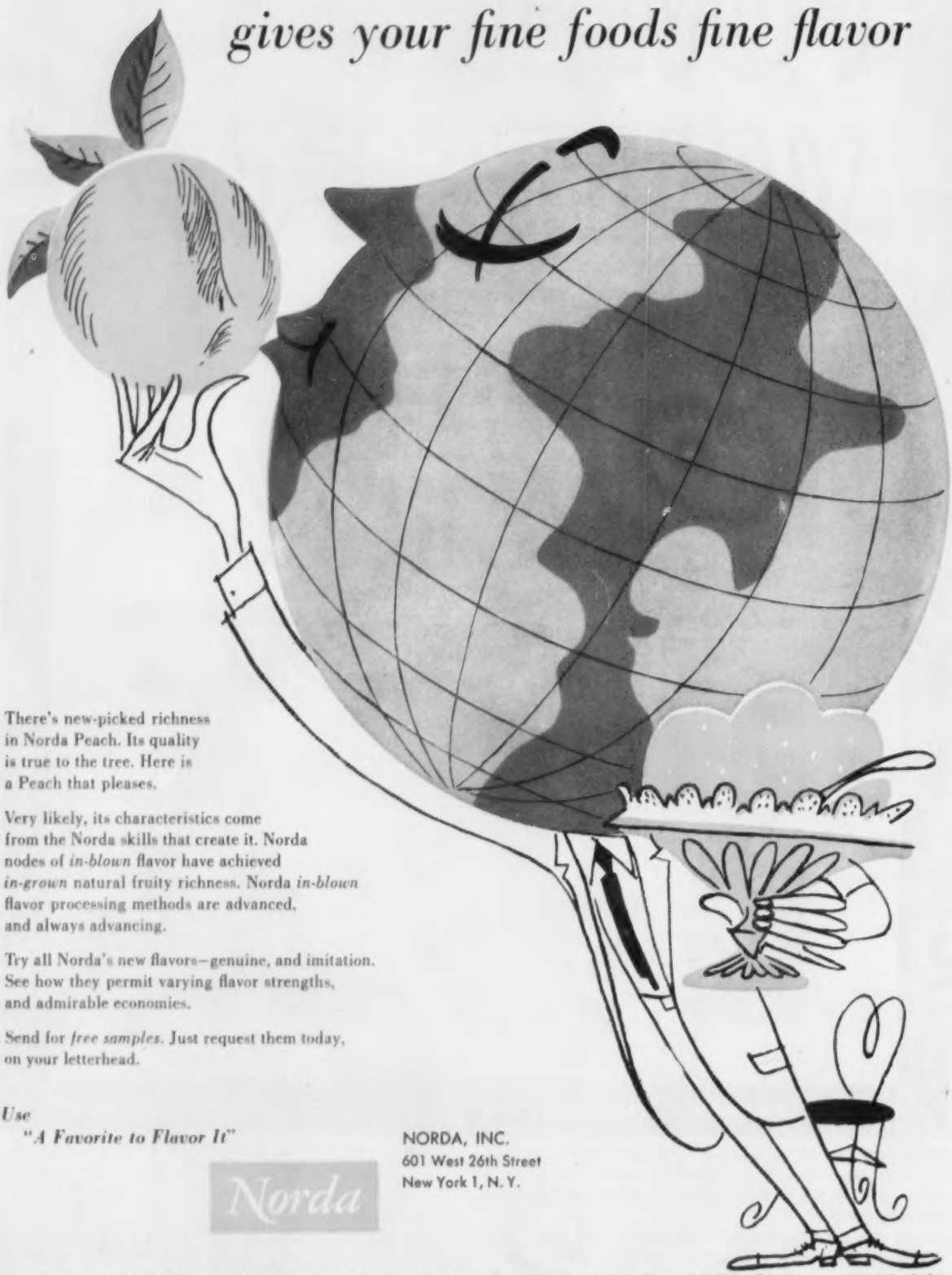
Shown above are just a few Powell Valves. Investigate these valves . . . *and* the *complete* line of quality valves made of bronze, iron, steel, special alloys and pure metals.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our complete line, and help solve any flow control problem you may have. Write . . .

The Wm. Powell Company, Cincinnati 22, Ohio . . . . . 109th year

For more information, use coupon on last page.

This peach with its fresh orchard taste gives your fine foods fine flavor



There's new-picked richness in Norda Peach. Its quality is true to the tree. Here is a Peach that pleases.

Very likely, its characteristics come from the Norda skills that create it. Norda nodes of *in-blown* flavor have achieved *in-grown* natural fruity richness. Norda *in-blown* flavor processing methods are advanced, and always advancing.

Try all Norda's new flavors—genuine, and imitation. See how they permit varying flavor strengths, and admirable economies.

Send for *free samples.* Just request them today, on your letterhead.

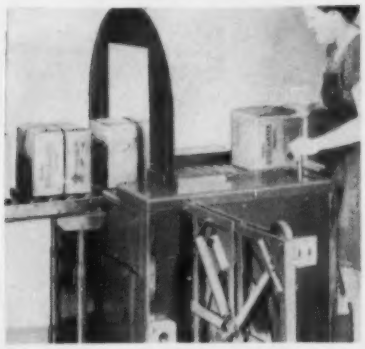
Use
"A Favorite to Flavor It"

Norda

NORDA, INC.
601 West 26th Street
New York 1, N. Y.

CHICAGO • LOS ANGELES • SAN FRANCISCO • MONTREAL • HAVANA • LONDON • PARIS • GRASSE • MEXICO CITY

Equipment & Supplies



Cartons Strapped, Sealed By Automatic Bander

Designed to increase packaging-line speed, this bander automatically straps and seals cartons at rates up to 1,000 per hr. Unit handles packages with minimum width of 7 in., and up to 22x20 in.

Called Autobinder, electrically-powered unit applies and tensions the strap, makes and crimps its own seals from a steel coil, and cuts strap. Operator controls complete operation with one lever. Packages of different size and contour are banded successively without machine adjustment, and strapping tension is said to be quickly and easily changed.

Machine is 31 in. high and is furnished with a reel for dispensing the $\frac{3}{8}$ in. x 0.015 in. steel strapping.—*A. J. Gerrard & Co., Melrose Park, Ill.*

Circle 153A on Reader Service Card

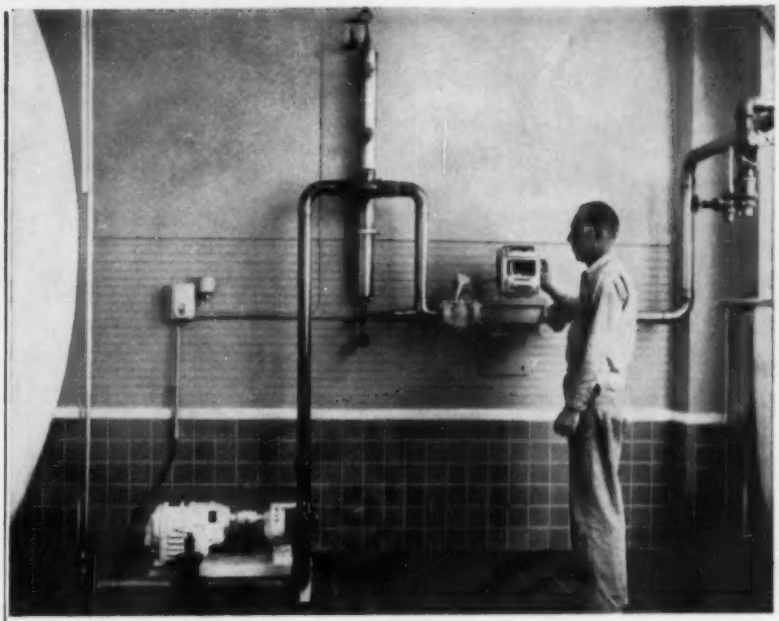
New Chemicals

Non-Caloric Sweetener Added to Chemists' Line

Calcium cyclamate, a stable non-caloric substance with about 30 times the sweetening power of ordinary sugar, is offered in a new line for use in food processing.

Present applications are in dietetic carbonate beverages and canned fruit, including those prepared especially as salt-free items. It is compatible with natural and artificial flavors and produces no off-taste when used in concentrations up to 0.55%—two to three times that required in most beverage formulas. Minor changes in product consistency, caused by replacement of sugar, generally may be overcome with use of thickeners such as pectin, carboxy methylcellulose, or sorbitol.

Material has been found safe for food used by FDA, but is subject to



Simple Metering System
Boosts Trend to Liquids
For Lower Materials Handling Costs

Many ingredients can be handled more economically, with closer formula control, by converting from bulk solids to liquids.

Liquid sugar, for example. It's delivered by tank truck to a simple storage and pumping system in your plant. Put a Neptune Auto-Stop meter at each mixer or kettle and you literally have "push-button control." You just push buttons on the meter to set the quantity, open the valve, and the Auto-Stop shuts off *automatically* . . . "on the nose."

You make these savings: (1) Fewer rejected batches; (2) no heavy bags to lug, no scale weighing; (3) no sifting or spills, hence fewer rodent problems; (4) save valuable storage space by placing tanks in cellars or on roofs; (5) cut hidden losses, get easier inventory figures.

Neptune meters now handle more than 150 different liquids. Capacities from 2 to 1000 gpm., bronze construction. Registers range from simple counters to electrical switch controls for pumps, valves, agitators. Write or phone for details.

NEPTUNE METER COMPANY
19 West 50th Street • New York 20, N. Y.

Branches

ATLANTA • BOSTON • CHICAGO • DALLAS
DENVER • NO. KANSAS CITY, MO. • LOS ANGELES • LOUISVILLE • PORTLAND, ORE.
SAN FRANCISCO

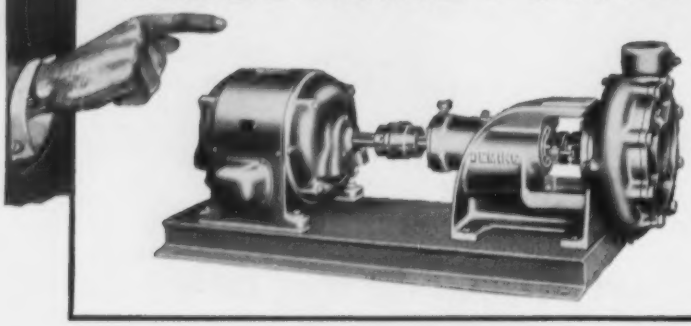
In Canada: NEPTUNE METERS LTD., 1430 LAKESHORE RD., TORONTO 14, ONT.

Ask for Bulletin 566-TF

For more information, use coupon on last page.

The more you need pumps,
the more you need...

DEMING
INDUSTRIAL PUMPS



here's an example: Optional features of the Deming Fig. 4011 Centrifugal Pump (shown above) extend its scope of uses to handling a wide variety of different kinds of liquids . . . corrosive or non-corrosive. In many cases, this versatile pump eliminates the need for higher-cost pumps built entirely of corrosion-resistant metals. Other optional features include a choice of impellers and either stuffing box, or mechanical seal construction. BULLETIN No. 4011 explains this popular Deming Pump. Send for copy.

NOTE THE SCOPE OF THE DEMING LINE

- Small side suction Centrifugal Pumps
- Centrifugal Pumps with separate liquid end
- "Motor-Mount" Centrifugal Pumps
- Split case Centrifugal Pumps
- Self-priming Centrifugal Pumps
- High pressure Multi-Stage Pumps
- "Oil-Rite" Duplex and Triplex Pumps
- Condensation Return Units
- Vertical Turbine Pumps
- Vertical Sump Pumps
- Vertical Sewage Pumps
- Submersible Pumps

A Deming Distributor is near you for prompt service

75th ANNIVERSARY DEMING PUMPS 1880 - 1955

THE DEMING COMPANY
656 BROADWAY • SALEM, OHIO

Equipment & Supplies

labeling regulations. It is supplied in 100-, 25-, and 5-lb. fiber drums with polyethylene liners.—*Chas. Pfizer & Co., 630 Flushing Ave., Brooklyn 6, N. Y.*

Circle 155B on Reader Service Card

New Reagents Speed Settling, Filtration

Finely divided particles in liquid suspension are said to be rapidly flocculated with use of a new group of synthetic polymers. Thus, faster settling and filtering results.

Called Aerofloc Reagents, they consist of complex molecules that quickly bond individual particles into flocs. Resulting clarified supernatant may then be discarded without polluting streams.

And as filter aids, these agents make filter cakes firmer and more porous. They help to prevent blinding of filter cloth and increase washing efficiency.—*American Cyanamid Co., Mineral Dressing Dept. 30 Rockefeller Plaza, New York City 20.*

Circle 156A on Reader Service Card

Briefs . . .

Beverage Hand Truck has 16½-in. width for maneuverability in narrow aisles, handles up to five 24-bottle cases.—*Milwaukee Truck Co., 250 N. 12th St., Milwaukee 3.* (156B)

Precision Manostat that controls a vacuum down to 2 mm. Hg. is offered for use in laboratory or pilot-plant distillation and vacuum drying systems.—*Precision Scientific Co., 3737 W. Cortland Ave., Chicago 47.* (156C)

Packaging Desiccant has high moisture-adsorbing capacity in lower humidity ranges. Material is inert, odorless, and non-toxic.—*Culligan, Inc., Northbrook, Ill.* (156D)

Tachometer Takeoff Head employing simple speed-sensing element to cover 100 to 5,000-rpm. range, transmits current measured on maker's centrally located indicator either nearby or up to 1,000 ft. away.—*Metron Instrument Co., 432 Lincoln St., Denver 3.* (156E)

Standardized Stock Solutions of 60 common chemicals offer economy, accuracy, and convenience in quality control, research.—*Chicago Apparatus Co., 1735 N. Ashland Ave., Chicago 22.* (156F)

At Lohrey Packing Company in Cincinnati, Wear-Ever's Tote Box rates high for service. Its portability and light weight make it the perfect transport container.

for • better service
• fewer losses
• easier handling

IT'S THE ***NEW*** ALUMINUM

TOTE BOX

by WEAR•EVER

Dimensions:
13½" x 32" (Inside Top)
11" x 29½" (Inside Bottom)

It's Sanitary!

Drawn completely seamless from heavy gauge wrought sheet, aluminum alloy, full 12" deep. Rounded corners. No cracks, seams, crevices.

It's Labor Saving!

Light in weight, easy to handle, because it's *aluminum* alloy.

It Cuts Costs!

Made from extra tough, heavy-gauge wrought aluminum alloy sheet for years of trouble-free service and satisfaction.

It's New!

EXCLUSIVE FEATURES

1. Top edge fits hand for comfortable handling.
2. Extra strong: double embossed side panels, triple embossed bottom panels.
3. Completely seamless—easy to clean.

Stack when filled

Nest when empty

WEAR•EVER

Aluminum

UTENSILS

THE ALUMINUM COOKING UTENSIL CO., INC.,
WEAR-EVER BLDG., NEW KENSINGTON, PA.

The Aluminum Cooking Utensil Company, Inc.
309 Wear-Ever Bldg., New Kensington, Pa.

GENTLEMEN: *I'd like to know more about your new tote boxes.*

☐ Send me your catalog. ☐ Have your representative see me.

NAME.....

TITLE.....

Fill in, clip to your letterhead and mail today.

NEW ITEM! *Wear-Ever's new Nickel Scouring Cloth. Won't scratch, won't mar, far outlasts ordinary scouring cloths. At your dealer's.*

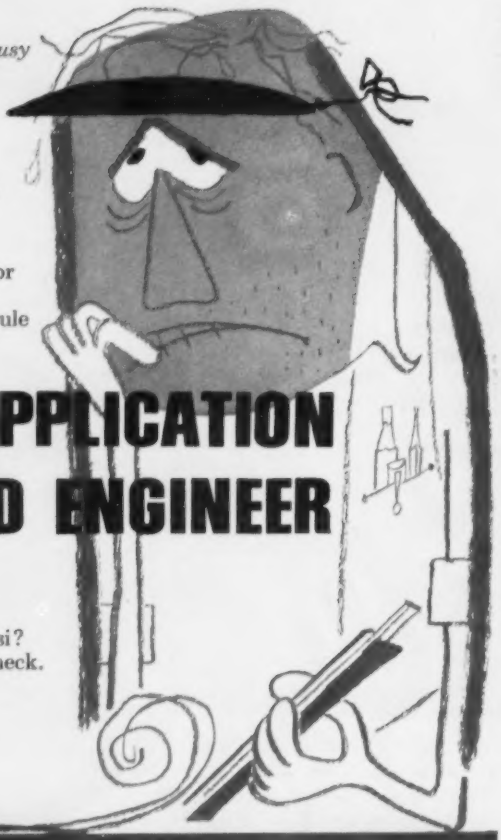
For more information, use coupon on last page.

S/K apades in industry

Take pity on Herman
(an overworked engineer).

With time at a premium, busy, *busy* Herman had to devise a simple, compact, and safe method for using plant steam to heat water for tank and vat scouring purposes. It was also desirable that some means be provided for controlling the hot water temperature.

Herman decided a jet was ideal for the job. Herman was right!
He took pencil, paper, and slide rule in hand and settled down to



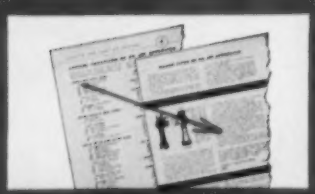
THE CASE OF THE JET APPLICATION AND THE OVERWORKED ENGINEER

work out the problem . . .

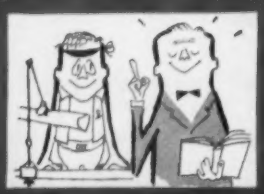
Syphon? Eductor? Exhauster, compressor, jet vacuum pump? psi? gpm? Derivation, computation, check.

Herman was wrong! And, he knew it—knew there had to be an easier and better way.
So this is what he did . . .

Bulletin J-1 on "Jet Apparatus and Its Industrial Applications." Found out what he needed to know about the characteristics, variables and ranges of Jet Apparatus.



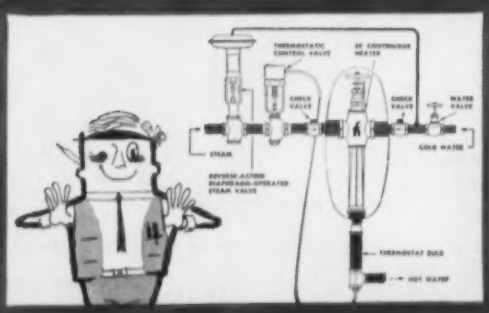
required and the types of jets suitable for such a function. Identified the type most suitable for his particular requirements.



SK Sales Engineer, who gave him a specific recommendation.

SOLVED THE PROBLEM EASILY!

The SK Fig. 310 Steam Jet Combination Heater shown at right mixes steam with cold water to provide hot water. A thermostatic control valve limits the amount of steam admitted and thus controls the temperature of the hot water. A reverse-acting, diaphragm-operated steam valve prevents steam from discharging before the water valve opens or after it closes.



Moral! Request a copy of Bulletin J-1 for your files. Make use of a qualified specialist, your nearest SK Sales Engineer.

Schutte and Koerting
COMPANY
MANUFACTURING ENGINEERS

2223 STATE ROAD, CORNWELLS HEIGHTS, BUCKS COUNTY, PA.

Jet Apparatus • Heat Transfer Equipment
Strainers • Condensers and Vacuum Pumps
Oil Burning Equipment • Rotameters
Flow Indicators • Radiaflo Tubes • Valves
Spray Nozzles and Atomizers • Gear Pumps
Desuperheaters

Reefer Tanks for Fish

—*Continued from page 111*

more distant from the cannery. And unlike the unrefrigerated salmon boats, the barges can remain in fishing waters a much longer time without any harm to fish quality.

Heretofore, barges or fishing boats used only ice for holding fish. These vessels would have to return to shore when the ice melted, even though a full load hadn't been accumulated.

When installed ashore, refrigerated tanks provide a reservoir of fish with which canneries may even out production. Formerly lacking such refrigeration, canneries had to operate until all the available catch of salmon was canned. But with these shore tanks, overtime operation is eliminated, since the fish may safely be held for the next day's operation.

In the tanks, fish float in sea water and are almost buoyant even at the capacity load. Formerly they were packed in chopped ice and the pressure of both fish and ice resulted in serious weight loss.

End (Resume reading on page 113)

Timed Program Control

—*Continued from page 87*

steam valve closes, and the retort is blown down. Retorting then stops, unless the operator wishes to cool goods in the retort for a minimum period.

For "Steam Cook With Pressure Cool", a selector is set for this operation. In this case, the sequence of operation is similar to the previous one. Only exception is that, at the end of the cook time, an air-operated pressure controller is actuated. In this case, cooling takes place within the retort and at a pressure that avoids damage to large cans.

As an added safeguard, the system is equipped with a time and temperature-cooling device. With this safety interlock, cooling water leaving the retort must drop to a predetermined safe point before cooling timer starts.

This safety feature thus takes care of cooling variations likely to result from changes in temperature or pressure of incoming water.

To switch to "Glass Cooking", a minimum number of hand valves on the piping are changed so that steam and water additions conform to the recommendations of the glass manufacturers. Only change within the timed-program controller is setting the cook-selector switch to proper point.

Also on door of program control is a "Pre-Heat" pushbutton. Retort operator, in this case, resets the control point of the temperature instrument to the preheat value recommended by the glass manufacturer. He will then press the "Preheat" button for automatically bringing retort to preheat temperature for loading with glass jars.

After retort is loaded and locked, operator sets processing temperature point to its normal value. Once again, he presses "Start" button, and operations proceed through the recommended processing cycle. Here, venting is eliminated and pressure is immediately controlled, with selections by proper locations of the cook-selector switch.

Contrast With Old Way

Just as an example, let's see what the retort man at this packer's plant had to do when manually operating one of the retorts:

Venting required four steps—turning on steam, waiting for venting, closing vent valve, and estimating venting time by watching thermometer, pressure gage, and clock.

And cooking involved two steps—timing cook by checking the temperature-recording chart and adjusting steam valve, then closing steam valve at end of cook.

Further, cooling took six steps—opening cooling water valve, continuing cooling by guessing to 100-deg.-F. internal temperature of can, closing water valve, turning off air, opening vent valve, and then opening drain valve.

End (Resume reading on page 88)

Bread Freezing Plant

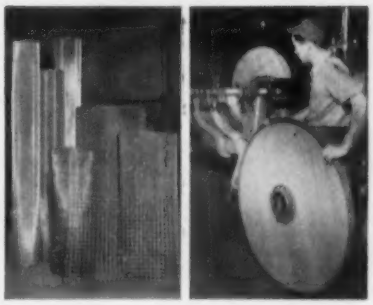
—*Continued from page 76*

2nd stage a 20 hp. unit for use with F-12. This will produce a saving in excess of 15 hp. over the single-stage system.

Both units will use the same basic compressor, and many of the parts will be interchangeable. Motors for all units (including storage room compressor) will be in a size range comparable to those used in other parts of the bakery.

The equipment can be arranged so that the suction and discharge lines of the F-12 compressor are kept short and a very compact operating unit attained. Total gas charge will be increased, and the heat exchanger will require insulation. But, when all factors are taken into consideration, the system will operate with little difficulty and the initial invesment will not be found to be excessive for the advantages attained.

The F-22 gas will be condensed at 30 F. by expanding F-12 liquid



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This gun gives the old one-two to tough cleaning jobs. Just turn the valve to clean—hot detergent solution blasts away, breaks up the soils . . . gets into every corner and crevice, on top or underneath. Turn the valve again to rinse—soil floats right off, equipment dries down fast, and *clean*.

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There's no easier way to clean tables, packaging machines, elevators, conveyors, peelers, fillers, can sealers, walls, floors. Most workers like it because they get more work done in less time, with less effort. Your equipment likes it . . . no scouring means longer life.

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through the coil of the heat exchanger at 20 F. The F-12 can be condensed by several methods, depending upon local conditions.

If water shortage is the prime consideration, air cooled condensers can be mounted on the roof of the compressor room. Or an evaporative condenser can be used to advantage if the space is not at a premium and wet bulb conditions are satisfactory.

The proper condensing medium depends upon individual plant conditions, and it is difficult to justify any particular system without knowing these conditions.

Compressor Room

To reduce pressure drop in the lines and hold installation costs to a minimum, the compressor room should be located as close to the freezing room as is practical.

A piping corridor between storage and freezing rooms provides ready access to all piping and controls, also obviates the necessity of making repairs in a −20 or 0 F. room. Expansion valves must be located close to the evaporators, but when properly installed these should require little or no attention. Hot gas defrosting is extensively used and can be made automatic.

The electrical system should be carefully planned for economical conduit runs and for convenience in maintenance. Combination line starters are very convenient for maintenance purposes and will be found advantageous for the compressor motors. The total installed cost will not be greater than the use of separate line starters and safety switches or a main circuit breaker panel. Controls for this type of plant are not too involved, but certain interlocks will be required.

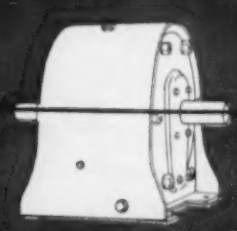
It is well to provide a terminal cabinet for all control wiring, so that each wire can be labelled. This will simplify the maintenance. And it will make minor modifications in the control system easier, if future requirements dictate them. In most cases, the control wiring should be kept separate from the power wiring and be operated at 110 v. for maximum safety and convenience.

Many times auxiliary switches or other control devices are located on the grounded side of the operating coils. This should be avoided in all cases, because it will cause a great deal of trouble in case of a ground in the wiring ahead of the operating device.

A schematic wiring diagram should be available to the maintenance man for quick tracing, in case of signs of false operations in the system.

End *(Resume reading on page 77)*

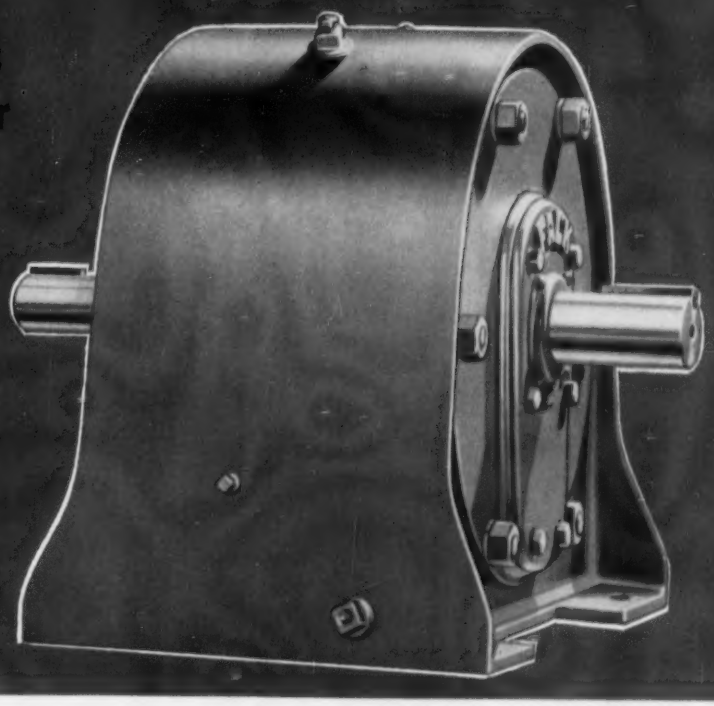
The versatile, STRAIGHT LINE

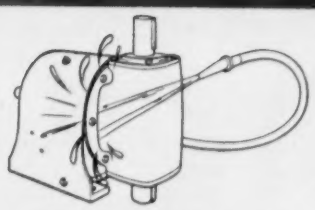


ALL-STEEL FALK SPEED REDUCER

(Concentric Type)

High and low speed shafts suitable for V-belt, gear or chain as well as coupling connections





The Type "C" Speed Reducer has these "In-built" Factors:

Sealed Housings. Dual closures and one-way vents keep oil in, dust and moisture out. Units are splash-proof, leakproof, dust-proof.

Positive Lubrication. Large sump capacity . . . oil-tight construction assures clean lubricant . . . direct dip of revolving elements provides positive lubrication at all speeds.

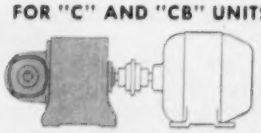
Precision Gearing. Heat treated alloy steel, precision cut and shaved helical gearing throughout . . . quiet-operating crown shaved pinions . . . taper bored gears for easy ratio changes.

Wide Speed Range. Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

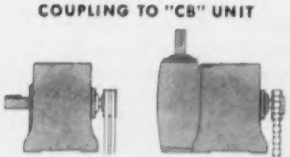
All-steel Housings. Unbreakable, strong, rigid. Generous overhung load capacities provided by wide bearing spans, large shafts and bearings.

Streamlined inside and outside. Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

A FEW TYPICAL DRIVES FOR "C" AND "CB" UNITS



COUPLING TO "CB" UNIT



V-BELT TO "C" UNIT

CHAIN TO "CB" UNIT

The ideal type for Turbine, Engine or Special Motor

Here is an exceptionally versatile member of the famous FALK line of reduction units. The Type "C" Straight Line Speed Reducer is an all-steel concentric shaft unit rated in accordance with AGMA standards. It is structurally similar to the universally popular FALK Motoreducer, and offers many special application advantages.

It can be driven by motor, turbine or engine with direct coupling connection—or through a V-belt or chain drive. It lends itself effectively to hydraulic coupling, brake-wheel or overload protective coupling, multi-speed transmission, or to variable speed drives—without modification. Units can include self-contained backstop if desired. Ratio can be modified with easily installed stock gears. With modifications, unit can be used as a speed increaser.

These all-steel Straight Line Speed Reducers are *available for prompt delivery* in standard ratios in horizontal and vertical concentric models, also in horizontal and vertical right-angle models; in single, double, triple and quadruple reduction. For full details, write for Bulletin 1104.

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NEW PACKAGES & PRODUCTS

Dietetic Process Cheese

Reported as first low-calorie cheese product, Chef's Delight is being marketed by Fisher Cheese Co., Wapakoneta, Ohio. The process cheese spread has a caloric content of 61 per oz.

Packed in a 2 lb. loaf, cheese may be sliced, spread, or melted. Labeled as imitation pasteurized process cheese spread, product contains American cheese, part skim milk cheese, water, non-fat solids, whey solids, disodium phosphate, sodium nitrate, locust bean gum, artificial color, citric acid, 10% minimum butterfat, and 58% maximum moisture.

The cheese is distributed nationally. Processor is currently planning to introduce a salt-free aged cheese for diabetics.

Wiener Picnic Pack

A 3-lb. frankfurter package, ideal for picnics and parties, is being produced by Central States Paper & Bag Co., St. Louis. Package is a round-bottom polyethylene bag that offers snug fit and attractive appearance. A St. Louis packer is reported to have had a ten times increase in sales volume with use of package.

Circle 162A on Reader Service Card

Tall Can Cuts Concentrate Freezing Time

A "tall quart" for citrus concentrate has been introduced by Crown Cork & Seal Co.'s Can Division. The can (above, l.) is of standard construction but its smaller diameter cuts freezing time, and is easier for consumer to handle. Production of the units will begin next month at company's Orlando, Fla., plant. (162B)

Two new can designs are offered by Continental Can Co. A 9-oz. cap sealed soft drink can incorporates company's outside curl on the top of the cone, eliminating raw metal inside can. A spray wax coating lines can.

The slender can is the same diameter as a standard 6- or 7-oz. soft drink bottle, and is almost the same height. With its 202x503 dimensions, the can may be used with present bottling equipment with minimum modifications.

The can may also be used in vending machines, and will fit in standard 6-pack bottle carriers. (162C)

Made by the same company is a cluster beaded can in #10, 46-oz. (above, r.), and #2½ can sizes. A series of shallow, narrow beads are placed equidistant from top and bottom of can. Advantages include stronger can structure with greater paneling and axial load resistance, a more positive soldering of side seam, better labeling surface. It also minimizes enamel scratching, and leakage from tab or lap fatigue.

Cluster beads are put in over a standard lock and lap seam, prebumped in the bodymaker. (162D)

Circle Key Numbers on Reader Service Card

Two Dietetic Dressings

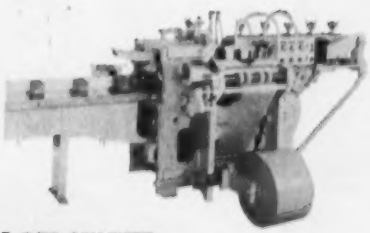
Latest low-calorie dressings are Trim Salad Whip and Trim Chef Dressing. Made by Trim Foods Inc., Englewood, N. J., the products were developed after two years of research by leading food technologists.

Trim Chef Dressing is boiled-type dressing with a creamy, homogenized texture. No sugar is used in manufacturing the dressing which holds only four calories per teaspoon. It is non-separating and need not be shaken. Container is a 6-oz. bottle.

The Salad Whip contains only 18 calories per tablespoon and is packed in a standard ½-pt. jar.

PROTECTED BY RIEGEL

POUND PACKAGE OF NABISCO SUGAR HONEY GRAHAMS CONTAINS THREE ½ LB. INNER-SEALED UNITS, WRAPPED IN A RIEGEL "TAILOR-MADE" WAXED GLASSINE.



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Easy-Serve Olive Jar

Olives may be easily and neatly removed from jars used by Brookdale Food Co., with a new patented plastic holder. The olives fit in four tight rows on the holder. A pull on a flexible tab lifts the olives up above the jar mouth. The stuffed olives are packed with the pimento-stuffed ends facing out, adding to the attractiveness of the package.

Powdered Tomato Juice

A tomato powder has been developed by Agricultural Research Service, USDA to meet an armed forces need for a product which would take little storage space, ship easily, and need no refrigeration.

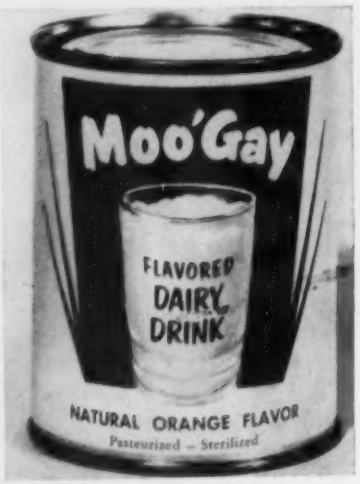
Puff-dried in a vacuum chamber and then pulverized, the product retains color and flavor. It is particularly suitable for tomato juice, and sauces.

Dietetic Beverage Powder

Available in grape, raspberry, cherry, orange, lemon, and lime is Presto, a powder that makes a non-fattening carbonated beverage when mixed with water. Processed by Presto Beverage Corp., the powder is packed in a double cellophane packet, twelve packets in each carton, colored to identify the flavor.

The powder is placed in a dry glass and cold water added. In ten seconds carbonization takes place. No stirring or mixing is required.

Processor's future plans call for range of 18 different flavors.



Flavored Dairy Drink

Moo' Gay, a strawberry, banana, and orange flavored dairy drink is now on the Denver market.

Universal Beverages, Inc., is handling national promotion and distribution of the novel beverage. It will be produced by established dairy plants under a franchise arrangement. Special equipment necessary for production will be made available by Universal.

Base of drink is a fresh, nonfat milk processed by a combination of ingredient-blending developed by A. P. Stewart & Assoc., San Francisco, and sterilized by Graves-Stanbaugh process. Requiring no refrigeration, Moo 'Gay is aseptically filled in 8-oz. cans.

Davy Crockett Sells Food

A baker and a frozen food processor are cashing in on the current Davy Crockett craze.

Weston Biscuit Co., Passaic, N. J., is packaging Davy Crockett Cookies in a bright five-color carton that features a sketch of the Western hero surrounded by Indians, buffalo, and blazing stagecoaches.

Frigidinner, Inc., Philadelphia, has introduced Davy Crockett's Pioneer Meal. The frozen dinner, "sized for small stomaches", includes pot roast of beef, mashed potatoes, and string beans. Two other children's meals, roast turkey and chopped beef, are also processed by company.

Heat-in-a-Bag Foods

Three single portion frozen dishes are being tested by Luchow's, noted New York City German restaurant. The company's first attempt at consumer retailing, the products are lentil soup with frankfurters, Salisbury steak with mushroom sauce, and Swedish meatballs in an herb cream sauce.

Food is in an airtight pliofilm bag. To prepare it, the unopened bag is dropped in boiling water and heated for twelve minutes. No defrosting is necessary. After heating, the bag is lifted from the water, opened, and the food served.

Outer container is a colorful red, yellow, and white carton that features an illustration of the restaurant exterior.

Bright New Cracker Wrap

A natural colored bleu cheese design is used as a background for the attractive new glassine overwrap for Schulze and Burch Biscuit Co.'s bleu cheese crackers. Printed over the cheese backdrop is the product identification in bright blue and white, surrounded by full size reproduction of the crackers.

An unusual feature is the vertical label on one side and the horizontal label on the other. This permits display variations.

York packs cool comfort in New Steel Drums

The York Corporation, manufacturers of refrigeration and air conditioning equipment has solved a problem which had plagued a number of customers by causing faulty compressor performance. A carefully conducted study showed that these operating difficulties were caused by moisture and other impurities found in refrigeration and lubrication oils. The same study discovered how to lick the problem – and the answer? York's carefully processed and blended quality oils are now shipped exclusively in NEW STEEL CONTAINERS!

Why don't you profit by York's experience! Ship in NEW STEEL DRUMS to maintain product quality and uniformity. Clean NEW STEEL CONTAINERS bearing the "Red-S" label of the Steel Shipping Container Institute protect products in shipment and in storage. They're your safeguard against claims and losses . . . and customer dissatisfaction. Write us today for complete details.

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Monarch offers a full line of efficient, dependable, advanced design nozzles to . . . . "

- WAX FRUITS
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- DRY EGGS
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Berries Without Syrup

Packed in transparent re-use plastic containers, Flamingo Frozen Foods Corp.'s quick frozen whole strawberries and blueberries are said to be the first packed without sugar or syrup.

New Jersey City processor is now distributing nationally after extensive tests. Berries are frozen by a special process which protects natural flavor. Strawberries are filled in 8-oz. containers, blueberries in 10-oz. packages.

Molded Poultry Basket

Directed at replacing the conventional paper tray is a colorful molded plastic basket for poultry. Called Plasket, the container was developed and is being marketed by Pacific Plastic Products, San Francisco.

The basket can hold a whole cut-up fryer, broiler, or fricassee bird, or selected parts. Available in a wide range of colors, it has a re-use value as well as sales appeal.

Advantages over paper trays are cited by the manufacturer as the elimination of wilted and shredded trays, complete product visibility, greater display value, and sanitary and tasteless and odorless nature of the plastic. The baskets are sturdy, will withstand freezing and are well adapted to production packing.

A small blotter is used to absorb juices, while the chicken is overwrapped with transparent film. Colors include white, red, yellow, green and blue.

Circle 166A on Reader Service Card

Coatings for Summer

A new line of colored summer-type pastel coatings have been introduced by the Nestle Co. under the Icecap Couvertures brand name. Made in white, green, pink, orange, and yellow, coatings will supplement company's Snow Cap white cocoa butter coatings.

Melting point of coatings is 93 deg., though manufacturer reports they they will retain their snap, gloss, and lustre in 90-plus temperatures.

Developed after five years of experimentation, coatings mark company's first marketing of a product made with vegetable oil instead of cocoa butter base.

Circle 166B on Reader Service Card

3 New Glass Containers for Processors

Anchorvac closures made by Anchor Hocking Glass Corp. are being used for three attractive new glass containers by food processors.

Sea Snack Co. is using a sherbet-style jar for its line of sundae toppings. All label information is printed on the colorful lithographed cap.

Presidential profiles decorate the glass tumbler packages of Teddie Brand nuts, packed by John W. Leavitt Co., Boston. Illustrations of presidents are in red, white and blue. The Anchorvac cap carries sales and brand data.

Bidding for the junior spaceman trade is a tumbler container decorated with solor system scenes. Baltimore processor, Schindler's Peanut Products, Inc., is using the container for 11-oz. of peanut butter. All three glass containers are made by Hazel-Atlas Glass Co., Wheeling, W. Va.

Circle 166C on Reader Service Card

Chili With Cheese

Recently introduced in the Texas area and planned for national distribution is Mountain Pass Chili Con Queso, processed by Mountain Pass Canning Co., Inc., Canutillo, Texas.

Reported as the first instance where it has been marketed in cans and unfrozen, the Mexican specialty is made with processed cheese, onions, salt, tomatoes, spices, and green chili. It is packed in a 7½-oz. can labeled with company's trademark, an Indian squaw, and a picture of the product.

Frozen Hamburger Pack

Two frozen hamburgers, complete with buns and butter, are packed in an attractive and practical package by Barra's Frozen Products, Chicago. The 'burgers are presented in a shallow aluminum foil tray with flanged edges. A laminated foil and paperboard lid closes the package.

Calcium propionate is added to the buns to retard spoilage.

Saves time in coding labels ...helps product quality control!

THE electrically operated Tickometer not only makes *big* savings in the cost of coding, dating or otherwise imprinting product labels and wrappers—it is equally valuable as an aid to quality-control.

It is remarkably efficient... imprints at speeds up to 1,000 *per minute* . . . and it counts accurately as it codes; records whole or partial counts. Saves losses on unused labels that have pre-printed codes or identifications. Handles almost any kind of card or paper item. Prevents imitations, identifies inspectors, origins, factory lots—quickly, cheaply, unobtrusively. And it's so accurate that hundreds of banks use it to count currency!

Rented, as well as sold, the Tickometer is backed by Pitney-Bowes service from 259 service points, coast-to-coast. Ask the nearest Pitney-Bowes office for a demonstration. Or, send coupon for a free illustrated booklet and folder of case studies.

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Here's Why

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Pressure Plate Freezers

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The No. 1 Choice of Frozen Food Processors Across the Nation

Amerio 15 Station Ammonia Flooded Type— Boston Bonnie Plant

FAST ECONOMICAL for full Quality Retention reduced power consumption

PACKAGE PERFECTION flat, uniform packages with great eye appeal

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TO MAKE MONEY in Packaged Frozed Foods — Institutional and Consumer — Meats, Poultry, Vegetables, Fruits, Fish Products, Precooked Foods, Standardize on Amerio Fool-Proof Freezers. Write for Details Today.

Designed For Ammonia, Brine or Freon Refrigerant

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Contact Plate Freezers Inc.
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"It's the Contacts that Count"

Send For Illustrated Brochure

Lemon and Lime Ade

Minute Maid-Snow Crop Frozen Foods has introduced Lemon 'n Lime Ade, a sweetened, frozen concentrate. Each 6-oz. can makes 1 qt. of the beverage. Product Carries Minute Maid label.

The company also reports that its Pink Lemonade, the first item to be packed under both Minute Maid and Snow Crop labels, is showing up well in market tests.

New Product Shorts

Instant Coffee with chicory is being distributed in the New Orleans area by Nestle Co., under brand name, Ricory.

Four Flavors make up frozen pizza kits processed by Luigi's Restaurant, St. Louis. Anchovy, sausage, bacon, and cheese flavors are packaged in polyethylene bag and foil tray package.

Spice Blend called Season-All is latest McCormick & Co., Inc., product. Made of spices, salt, MSG, and magnesium carbonate, blend is packed in 3¼-oz. shaker-top jars.

Diatetic Chewing Gum in five flavors—spearmint, fruity fruit, peppermint, tangy pep, and ammoniated spearmint—is processed by True Blue Gum Co., Grand Rapids.

Two New Flavors introduced at IFT Meet in Columbus were Dodge & Olcott's Butenille and Micronilla Vanrich. Both are particularly suitable for ice cream.

Dill Hamburger Slices are now in national distribution. The H. J. Heinz product is packed in a re-usable 11-oz. jar with lug-type vacuum closure.

Pour Spouts are new addition to H. J. Heinz Co.'s 7-oz. baby cereal line.

Foil-Wrapped Cartons are in use by Jewel Food Stores, Chicago, for their 2-lb. coffee package.

Two Pudding Flavors added to Royal Instant line are strawberry cream and banana cream.

Double-Wrapped golden foil Package is now used for Blue Bonnet Margarine.

Four Cheese Blocks are packed in new Swift and Co. 4-Pak. Each block weighs ¼-lb.

FOR PRE-PACKAGED MEATS

On Cards Or Trays These New Hand-O-Matic Features Mean Neat, Money-Saving Overwraps

Ten advanced design features, found only in the Hand-O-Matic, help you cut costs and get neater, more attractive packages on this semi-automatic wrapping machine.

1. Hinged, two-level side guides are quickly adjusted for cards or trays as shown above.
2. Improved cellophane tightener gives tighter wrap, provides bottom support for thin gauge flat cards and trays.
3. Vertical folders provide full control for flat cards.
4. Supporting lip of wide discharge paddle, specially designed for cards, prevents turning of packages, increases support.
5. Adjustable top pressure bars provide better package control. Hinged sealing bar prevents marking of package top.
6. New, shaped side folders eliminate wrapper bunching, assure better sealing.
7. Improved thermostats give better heat control.
8. One switch controls all heating elements.
9. Scientifically spaced holes in table top permit proper positioning of any trays.
10. 37" height puts wrapper table at just the right working level. Entire operation occupies only 9' 6½" of floor space.

The Hand-O-Matic gives you complete wrapping flexibility. You can change sizes in seconds without changing parts, wrap from 12 to 25 packages a minute. Package sizes range from a maximum of 12½"L x 9½"W x 5"H to a minimum of 4"L x 3½"W x ⅜"H. To get complete information, phone or write our nearest office.

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For more information, use coupon on last page.

IT'S NEW!

Beta 'Roche' CAROTENE

Gives foods true, natural yellow color and vitamin A potency

Processors of margarine, shortening, butter, cheese, yellow baked goods, confectionery and edible oils will be especially interested in the new and exclusive product of original Roche research: beta carotene 'Roche.'

Beta carotene 'Roche' has many advantages:

NATURAL COLORING

Beta carotene is the natural coloring matter of butter and other dairy products and is a constituent of cereal grains, alfalfa, carrots, and other vegetation. 'Roche' beta carotene imparts a *true* natural yellow color without any tinge of green. It does not change to a reddish color as do some vegetable pigments during storage.

ADDS NUTRITIONAL VALUE

Theoretically, one gram of pure beta carotene is equivalent to 1.67 million U.S.P. units of vitamin A. High retention of beta carotene-vitamin A activity is achieved in baked goods and other foods when margarine and shortening containing added beta carotene 'Roche' are used.

COLOR STABILITY

Extensive laboratory data show excellent color stability of margarine, butter, shortening, cheese, edible oils and yellow bakery products which were colored with beta carotene 'Roche.'

UNIFORMITY

The high degree of purity and color stability ensures uniform and constant intensity of color when using equal amounts per batch.

USAGE

Beta carotene 'Roche' is ideal for use in the following foods because it gives them *natural*, yellow color and vitamin A potency:

Margarine	Shortening
Butter	Cheese
Yellow bakery products	Confections
Edible Oils	

Detailed information about the application of beta carotene 'Roche' is available in a technical brochure. Ask your Roche salesman or write the Vitamin Division for this publication and for samples.

TECHNICAL INFORMATION

Crystalline beta carotene 'Roche' is in the all trans form

Empirical Formula: $C_{40}H_{56}$
Molecular Weight: 536.85
Melting Point: 183.0
Appearance: Red-violet platelets

Solubility in Edible Oils:

At room temperature	about 0.08%
At 60 C.	about 0.2 %
At 100 C.	about 0.8 %

Biological Properties

0.6 microgram beta carotene: 1.0 units of vitamin A
1.0 gram beta carotene: 1,666,666 + U.S.P. units of vitamin A

PACKAGING

33-pound steel pails, double Synthetasine lined, with removable-replaceable-leverlok cover.

3-pound triple-tite tamperpruf metal cans.

Batch size cans of Vitamin A and Beta Carotene 'Roche' blended in vegetable oil to your specifications.

24% Semi-solid Suspension of Beta Carotene 'Roche'
400,000 U.S.P. units per gram 'Roche' beta carotene in vegetable oils.

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ADVANCES IN TECHNOLOGY

Color Retained in Preserves By Low-Temp Concentration

It has been known that stored strawberry preserves suffered a loss of natural anthocyanin pigment with the formation of brown artifacts, but only recently has it been shown that these undesirable developments could be practically avoided by minimizing heat treatment and the possibility of oxidation.

If treatment is carried out in a vacuum pan capable of rapid concentration, and in the temperature range 90-100 F., 90% of the natural pigment may be retained. This is in contrast with losses of 30-70% in customary high-temperature preserving processes.

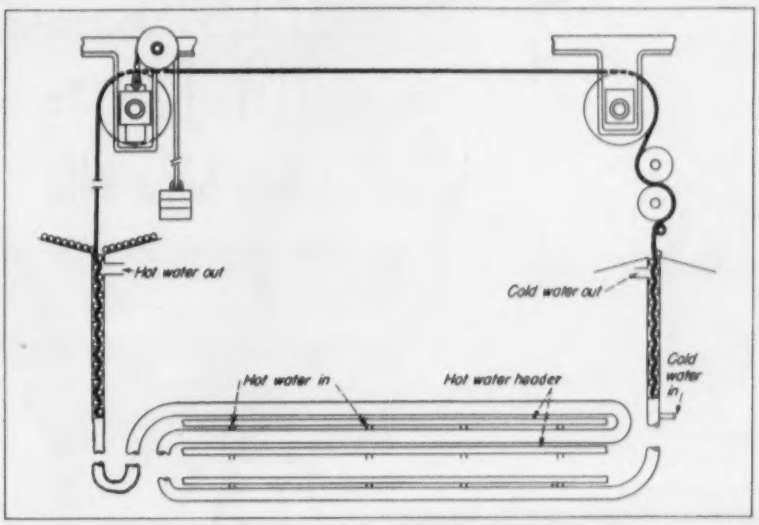
It has also been shown that both pigment loss and browning, and possibly breakdown of pigment to brown artifacts, are accelerated by oxidation during the process. Correct vacuum pan operation tends to limit degradation of the anthocyanin, and rapid pasteurization after concentration will keep oxidation at a minimum.—*Food Techonology*, 324-26, July 1955.

Spraying Dry Coatings

Designed to meet objections to prior units, a machine has been patented for applying dry coatings to ice cream bars in an efficient, sanitary and economical operation.

Essential elements of machine are a spraying rotor operating at the bottom of a vertical cylindrical casing, across the top of which the material to be coated is conveyed on spaced tracks. Coating material is fed to the rotor through a hopper.

Material that does not adhere to the confection falls to the bottom of the casing where moving arms direct it to the center to be used again. Compact design of the machine insures direct application of coating with minimum waste and pulverizing action.–U. S. Patent 2,710,588, June 14, 1955.



Improved Unit Rotates Containers During Heat Treatment of Foods

Apparatus has been patented for continuously processing canned foods under suitable conditions of temperature and pressure as the containers are conveyed through a conduit by means of flexible belts.

The metal conduit is of suitable size and shape to accommodate two parallel lines of containers. It comprises a vertical portion through which the containers are fed, a horizontal portion in which they are processed, and a vertical portion through which they are discharged (see drawing above).

Horizontal portion is made up of a series of straight tubes connected by elbows, through which the containers pass back and forth. Endless flexible belts are threaded through the conduit, and driven by a pair of rollers connected with a source of power. They are kept under tension by a weight that can be varied to meet conditions. These belts are made of metal or other material that will withstand an aqueous medium at temperatures of 250-260 F.

The horizontal tubes are connected with steam headers through a plurality of inlet pipes, providing heating means for the processing. The lowermost horizontal tube has a similar header and inlets for feeding cold water at the end of the processing period.

In operation, the conduit is filled with cold water, and steam is turned on to heat it to a maximum temperature of 250 F. The belt is started and cans are fed to it alternately from each side, the belt forming a sinuous line between staggered cans. Steam is fed at a rate sufficient to maintain the desired temperature and to establish a current of hot water countercurrent to the flow of cans, discharging near the feed tables. Cold water is fed to the other end of the system to cool the cans as they approach the discharge tables, near which it overflows.

To aid heat transfer, cans are constantly rotated as they pass through the system.–U. S. Patent 2,710,260, June 7, 1955.

Tray Dryer Operates Under Vacuum

Unique feature of a patented vacuum drying cabinet is design of the tray carrying the material to be dried.

A steam jacket covers the bottom of the tray, and is provided with a depressed portion or sump for the collection of condensate. A siphon extends upward from the sump and out of the jacket, opening into the cabinet. The latter is fitted with steam and vacuum pipes so arranged that when the tray is pushed in its jacket will make connection with a steam pipe, and its siphon will deliver condensate directly to the vacuum pipes.

Cabinet is divided into compartments, each fitted to carry three trays. Ceiling of each is provided with heating elements, with the result that the material in each tray is heated from above and below.

In operation, the cabinet will be under reduced pressure with corres-

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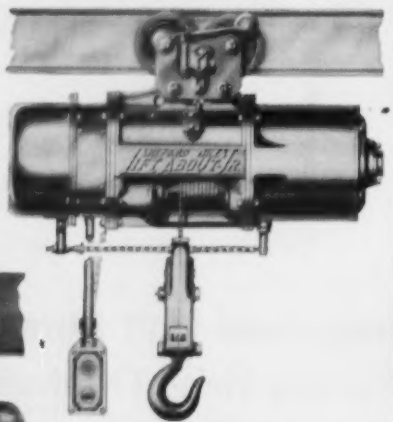

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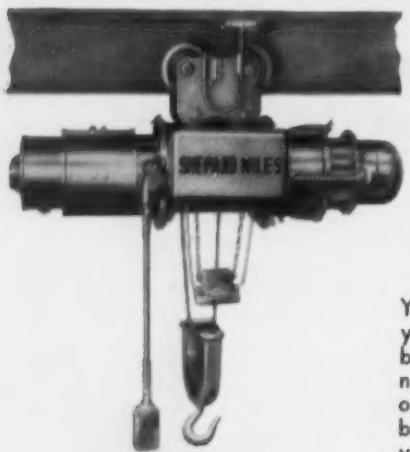

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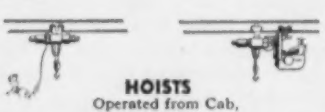

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pondingly low steam temperature, so that rapid but mild drying will be obtained. Vapor and condensate are removed as fast as formed. Design and operation of the cabinet are specially suited to the quick drying of delicate materials.—U. S. Patent 2,710,456, June 14, 1955.

Bacteria Counting Speeded

With the membrane filter method, bacterial samples of brewing operations can be handled rapidly and may be examined either with no incubation, or after 24-36 hr. The filters themselves may be stained, dried, and mounted in books to become permanent records of the tests made.

Filter consists of a sterilized disk of spongy cellulose acetate through which a suitable quantity of test sample, ranging from 1 to 500 ml. is passed. Microorganisms are trapped in or on the disk, which may then be examined directly under the microscope, or incubated in contact with a suitable nutrient, soaked up on cardboard sheets in a Petri dish.

After incubation, colonies may be counted in the conventional way, or portions of the disk can be cut out and examined microscopically. If disk is dried and then put in contact with stain-soaked blotting paper, the bacterial colonies are stained after which the disk may be dried again and mounted in a record book. Using these filters it was found possible to examine regularly 22 locations or materials in the brewery, a schedule not possible with the usual plating methods.—Brauwelt, No. 30/31, 421-27, 1955.

Solids in Skim Condensed By Refractive Indices

With sweetened condensed milks, refractive indices are in close agreement with the International Scale of indices for sucrose solutions at 20 C. Therefore a sugar-calibrated refractometer can be used for direct determination of total solids in this product.

In the case of skim condensed, however, there is considerable divergence from the sugar scale. But if the precise relationship is ascertained, the sugar-calibrated instrument can be used.

This was shown when refractive indices were determined on an Abbe' type refractometer of a number of laboratory- and plant-prepared skim concentrates. Solids varied from 9.9-45.2%.

Little difference was found between separate regression equations for the

what are good little Yarway Impulse Steam Traps made of?

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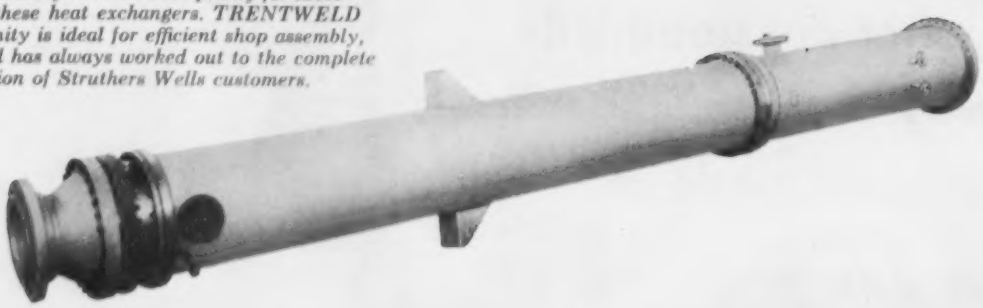

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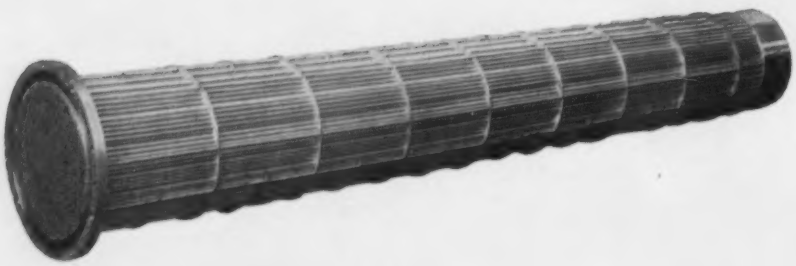

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It takes *specialists* to manufacture stainless welded tubing of uniformly high quality. That's why TRENTWELD is the *preferred standard* for quality wherever stainless or high alloy tubing is required.

For TRENTWELD stainless tubing is the product of tube mill specialists. The unique Trent process results in a *uniformly sound* weld indistinguishable from the parent metal—*and equal or superior to it in strength, ductility and corrosion resistance.*

Don't forget, too, that Trent offers you the widest size range found anywhere. ⅛" to 40" O.D. are standard sizes...and even larger diameters are available if you need them.

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different concentrates. The equation $TS = 0.9041\ R - 0.05$, where TS = total solids, and R = refractometer sugar scale reading corrected to 20 C. was found satisfactory. Correction factor of 0.077 per deg. C. was found applicable between 15-50 C.—*The Australian Journal of Dairy Technology* (Melbourne), Jan.-March 1955.

Test Detects Antibiotics Present in Raw Milk

A simple test for inhibitory substances in raw milk is based on conversion of 2,3,5-triphenyltetrazolium chloride (TTC) to formazone by the growing bacteria with production of pinkish red color. This is prevented by antibiotics at low levels.

In the test 9 ml. of raw milk is placed in a rubber stoppered test tube, pasteurized for 5 min. at 175 F., quickly cooled to 100 and inoculated with 1 ml. of previously prepared culture. This may be *S. thermophilus* or lactic starter.

Following mixing by twice inverting tube, sample is incubated in water bath for 2 hr. at 100 F. Then 0.3 ml. 1:25 solution of TTC is added, the tube inverted twice and returned to the water bath for 30 min. Sample is then observed for color change. White or pale pink indicates presence of inhibiting substance.

With S. thermophilus, presence of 0.04 units penicillin, 0.2γ aureomycin, 0.25γ terramycin, and 4.0γ streptomycin per ml. can be easily detected. —*Journal of Dairy Science*, 629-33, June 1955.

Cocoa Fat Determination

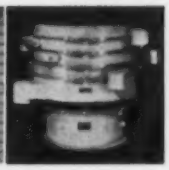
Fat estimations in samples of cocoa can be speeded by using an indirect method in which the defatted, dry residue is weighed instead of the separated fat.

No special apparatus is required and time for both moisture and fat determination is about 3 hr. Cocoa press cake samples should be finely grated and mixed with pre-dried sand before making moisture estimations by drying for 2 hr. at 220 F.

Samples are defatted by allowing to stand overnight in trichloroethylene, or heating in trichloroethylene with reflux for 15 min. Solution is then filtered through a sintered glass crucible, residue is washed 2 or 3 times with trichloroethylene, dried for 1½ hr. at 220 F., cooled, and weighed.

Results are reproducible within 0.1-0.2% fat, but will be lower than those obtained by acid hydrolysis.

SCREENING NEWS



Shrimp Canner Recovers By-Product Halts Stream Pollution with SWECO

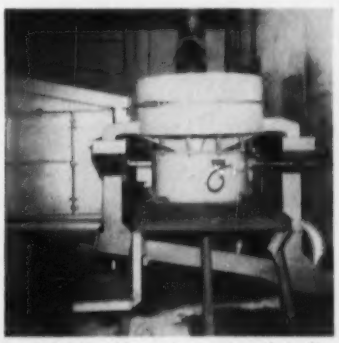
Screening problem: Recovery of high-protein cannery waste by the Robinson Canning Company, Westwego, Louisiana, for by-product resale to fertilizer mixers. Specifications: 800 GPM water carrying waste solids from shrimp canning operations. Previously unable to screen material due to blinding or clogging of screens!

SWECO solution: one 48-inch SWECO Gyratory Screen Separator with 20-mesh stainless steel cloth handles 800 GPM throughput without blinding. The SWECO installation shown below provides maximum throughput, minimum imparted vibration and minimum operating space. Results: (1) recovery of profitable by-product, (2) elimination of stream pollution, (3) Company highly satisfied with SWECO performance.

44% of the Largest U.S. Firms Use SWECO Separators

According to a recent customer survey, 55% of the nation's largest manufacturers use the products and/or engineering services of Southwestern Engineering Company. 44% are satisfied customers and users of SWECO Gyratory Screen Separators.

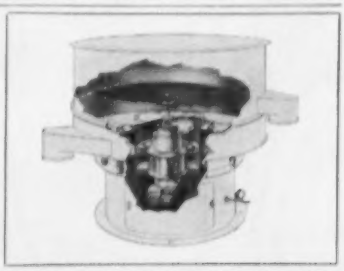
SCREENED WASTE SOLIDS are fed from screen spout to a conveyor belt. Material is dried, ground and sold to fertilizer mixers.



REAR VIEW shows two over-size discharge spouts below the screen which handle 800 GPM of cleaned waste water for discharge into a nearby canal.

Brewing Industry Uses SWECO in New Separation Process

New uses for SWECOs show a sharp up-trend in the Brewing Industry. In addition to the usual screening of dry cereals, wet hulls and cereal mashes, sal debris from wheat starch, etc., SWECOs are being used with marked success in the more efficient separation of wort and trub. The new method cuts down on trub "return" as the wort is decanted, and recovers an extra two barrels of wort per brew, from the remaining slurry.



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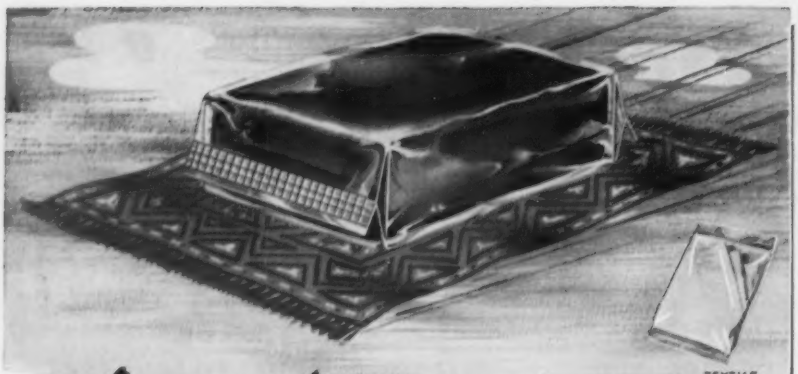

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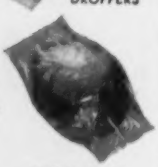
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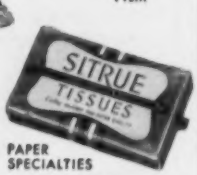

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Latter process seems to release some fats from phosphatides. Also some theobromine may extracted by the petroleum either used as the solvent. —*International Chocolate Review*, No. 6, 240-241, 1955.

Controlling Fat Bloom In Cacao Butter

Improvement of cacao butter by hydrogenation or isomerization is recommended as a means of circumventing the problem of fat bloom.

These means are suggested as being preferable to the search for synthetic or semi-synthetic fat composition to be used separately or in conjunction with the natural product. It is argued that these substitutes are completely devoid of the flavor-enhancing power of the natural product which makes it attractive to the consumer.

According to one process of hydrogenation, cacao butter is treated at 2,000 psi in the temperature range 100-150 deg. C. in the presence of Raney nickle as catalyzer. By varying time and temperature of treatment it is possible to control the degree of hardening within fairly narrow limits.

Isomerization involves transformation of oleic acid radicals in the unsaturated glycerides to a compound of different geometrical configuration. The basic method makes use of various nitrogen oxides. One uses both oxides of nitrogen and SO_2 applied as such or generated *in situ* by means of heat applied to nitric acid, ammonium nitrate or bisulphites. Extent of isomerization is controlled by time and temperature of treatment and quantity of reagent.

Main feature of another process is use of a special solvent that will not only dissolve the cacao butter but also take up 10-12% of water. Latter is used to bring nitrogen oxides from a second non-miscible layer into intimate contact with the butter substances. The process is rapid, but it cannot be stopped at intermediate points. Both processes have their advantages, but both will produce cacao butter products that will reduce the danger of bloom.—*Food Manufacture*, 286-89, July 1955.

Preserving Fish at Sea

Chlorotetracycline (CTC) at approximately 1 ppm. in either crushed ice or refrigerated sea water is extremely effective in controlling bacterial growth in fish during holding and transporting.

Trials were made using a small fishing boat equipped with 2 refrigerated

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More Oxidative Stability For More Foods At Low Cost . . . . . .

Compare the Performance of these Formulas with that of Any other Antioxidant

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Highly effective in retarding oxidation for long period in low concentration	YES—Contains Propyl Gallate	YES—Contains Propyl Gallate
Excellent "carry-through" stability after exposure to high (baking) temperatures	YES—Contains BHT and BHA	YES—Contains BHT and BHA
Non-toxic	YES	YES
Imparts no flavor, odor, or color	YES	YES
Develops no flavor, odor, or color during its stabilizing life	YES	YES
Doesn't cause metal-reactive discoloration of product	YES—Contains Patented* Lecithin-Citrate	YES—Contains Monoglyceride-Citrate
Oil-soluble	YES	YES
Water-soluble	—	YES
Reasonable in cost	YES	YES
Packed in convenient non-returnable drums	YES	YES

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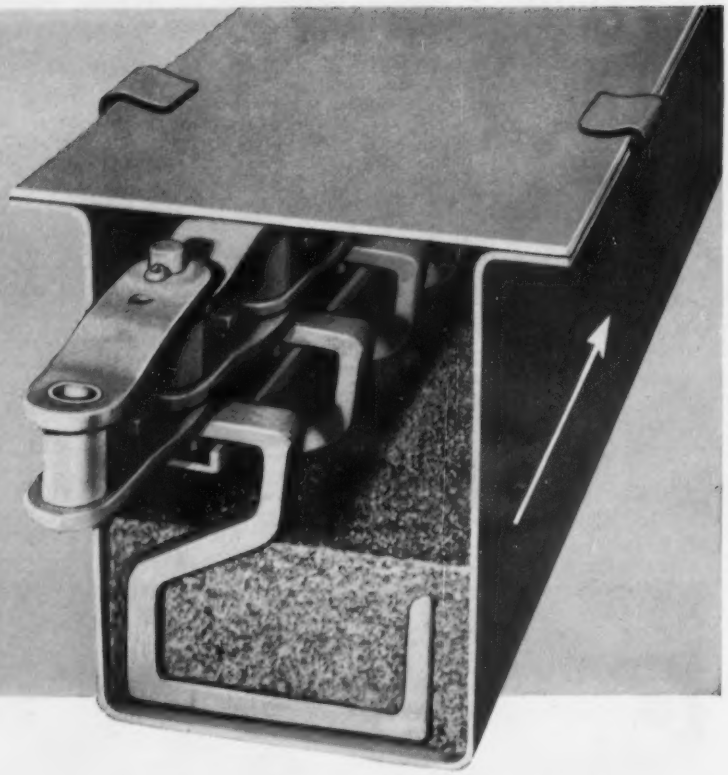

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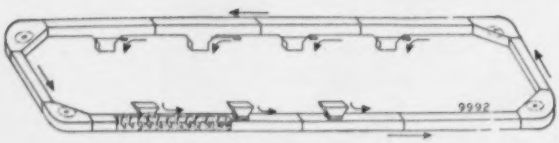

It conveys in four directions — can pick up and discharge at many points on its run simultaneously or selectively—does the work of several conveyors of other types. It is fully enclosed — dust-tight and contamination-proof. Because it moves materials *in mass*, in a solid column, it minimizes dust formation and degradation and practically eliminates explosion hazards.

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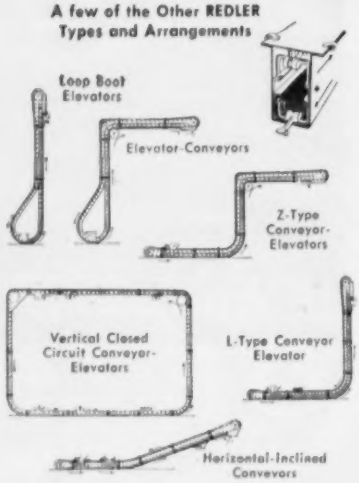

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sea-water tanks and space for icing fish. Coho, white spring and chum salmon, and grey cod (eviscerated at sea), and chum and coho salmon, and lemon flounder (not eviscerated) were stored in four ways.

Used were: (1) Ordinary crushed ice; (2) crushed ice containing 1 ppm. CTC; (3) refrigerated sea water (30 F.), and (4) refrigerated sea water with 2 ppm. CTC. Cargoes were stored 8 and 9 days, then sampled. In all cases, CTC greatly improved keeping quality of both eviscerated and non-eviscerated fish. This was particularly true with refrigerated sea water, where CTC caused marked delays in rate of bacterial spoilage. — *Food Technology*, 296-300, June 1955.

Detecting Washed Eggs

Washed eggs may be detected by a variety of methods, such as estimation of electrical conductivity of a drop of water in contact with the egg shell, or depletion of magnesium content of the shell.

None of the methods are fast enough for detecting washed eggs at even medium-sized egg-packing stations, and some of them are open to circumvention if the eggs are washed in a salt solution such as potassium chloride.

By applying a drop of silver nitrate solution, and then exposing it to ultra-violet light, the drop darkens on an unwashed egg and a dark brick-red precipitate appears in less than a minute. On a washed egg no darkening appears, or, at most, a sparse gray spot develops.

Reagent contains 0.1% $AgNO_3$ and 0.3% chloride-free photographic gelatin. Crops of approximately 0.0025 ml. are applied with a fine brush.

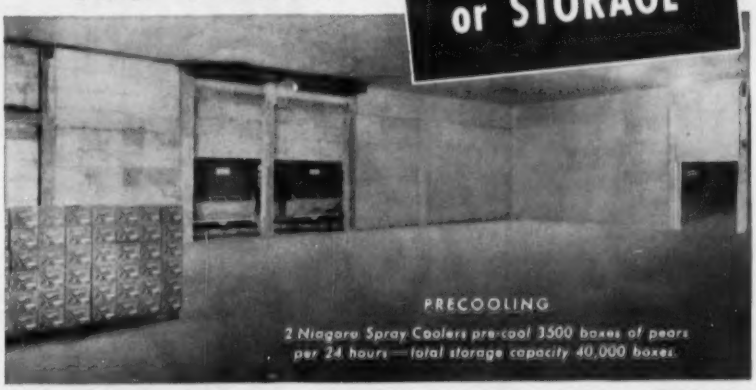
Identification of washed or unwashed eggs was 96% correct after exposure to ultra-violet for one minute. Eggs washed with 0.5% KCl could be detected most of the time. The silver reduction was slower (but faster than for a washed egg) and the precipitate was usually gray instead of red. Reagent deposits about 2.5 mcg $AgNO_3$ on the shell, equivalent to 1.6 mcg. Ag. Average natural Ag content in white of one egg has been estimated as 10 mcg.—*Journal of the Science of Food & Agriculture*, Vol 6, No. 7, 368-73, July 1955.

Coating Frozen Foodstuffs

Simultaneous formation on frozen foodstuffs of an ice glaze and a protective coating of polythene is the crux of a patented process for preparing such foods as fish, meat, and poultry for cold storage.

NIAGARA "No-Frost"

PRECOOLING or FREEZING or STORAGE



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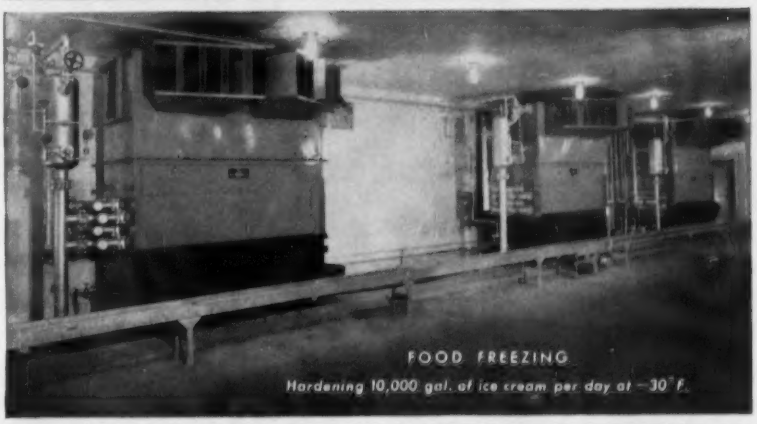
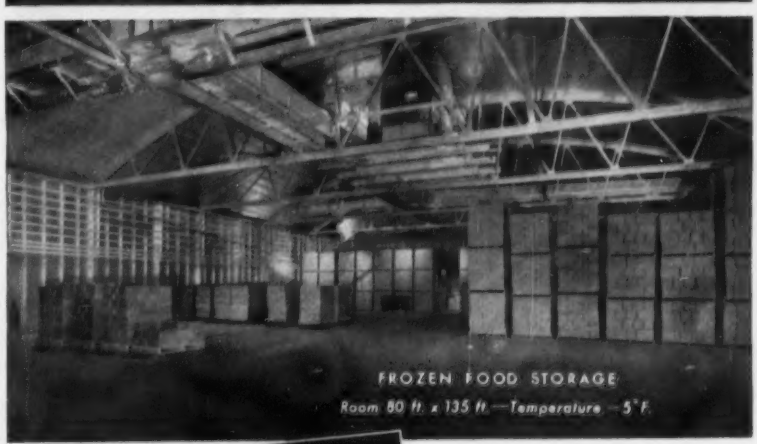


FOOD FREEZING

Hardening 10,000 gal. of ice cream per day at −30° F.



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Products are subjected to a quick-freezing process at a temperature of about −4 F. and immediately treated with polythene at a temperature of about −240 F. This shock treatment causes some of the ice crystals in the frozen product to evaporate and come to the surface of the food where the moisture is condensed and forms an ice glaze. Simultaneously the molten polythene solidifies and forms a protective coating over the ice glaze.

Polythene is applied by spraying or dipping, and is easily removed from the food product upon thawing. Foodstuffs thus treated can be stored at below-freezing temperatures for an indefinite period without shrinkage or loss of color or flavor.—U. S. Patent 2,712,503, July 5, 1955.

Fungal Enzymes in Baking

Substitution of the fungal enzymes amylase and protease for malt in bread making corrects certain defects in flours.

Proteolytic enzymes, which act on gluten, and diastatic enzymes which act on starch, can be added to the bread formula in optimum ratios. Addition of the former, for example, is undesirable in parts of the U. S. where a good deal of winter wheat is used. Here, amylase is preferable on account of its freedom from proteolytic activity.

On the contrary, spring wheat flours which require gluten development during fermentation are improved by the addition of protease. The separate use of the fungal enzymes, offers flexibility in the formula.

It is claimed, also, that modern methods of harvesting by combine, which eliminates the curing process formerly obtained when wheat was shocked in the field, reduces production of natural diastatic enzymes and calls for artificial fortification. Other advantages of fungal over cereal enzymes are that the former do not require special storage conditions and are available in highly concentrated form.—*Food Manufacture*, 274-76, July 1955.

Freezing of Bread

Recent laboratory tests have demonstrated some of the important principles involved in freezing of bread, and have provided a considerable amount of technical reference material for those interested in its commercial application.

Experiments were conducted in a blast freezer where both temperature and air velocity could be controlled over a range of conditions. Separate

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frozen foods

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chambers permitted use of either horizontal cross-flow or vertical through-flow air blasts. Unsliced loaves of commercial white pan bread weighing 22.5 oz. each were used. Data were obtained on effect of freezer temperature, air velocity, loaf position, wrappers, and loss of moisture.

With wrapped bread, temperature had the greatest effect on freezing rate. With unwrapped bread, the major factors were air velocity and position of the loaf in the air blast. The most rapid method of freeing was by means of a high-velocity, low-temperature blast at right angles to the long dimension of an unwrapped loaf. Under these conditions it was possible to freeze individual loaves in 30 min. with no significant loss of moisture.

Wrappers slowed rate of freezing about as much as a 10-deg. difference in temperature. Pasteboard packages slowed the process still further. Whole wheat bread froze at the same rate as white. Raisin bread froze at a lower temperature, and sour French bread at a higher temperature than white. — *Food Technology*, 342-46, July, 1955.

Coconut Products

Three food products are obtained from coconuts according to a recently patented process. Milk and meat are treated to yield a flavoring extract, a virgin oil, and a pure solid food.

Milk of fresh tree-ripened coconuts is collected and immediately pasteurized. Meat is separated from shells and immediately comminuted and imbued with alcohol or a mixture of alcohol and glycerol in a proportion of not less than 25% by weight of the comminuted meat. Hot pasteurized milk is then added to the meat-alcohol mixture in a proportion of 50% of the weight of the original meat. Meat-alcohol-milk mixture is then subjected to low pressure to extract most of the fluid which contains flavoring extract and fat.

A second extraction is made with boiling water, and the pressed liquor is added to the first extraction. Resulting emulsion is then refrigerated to cause fat to separate and solidify. The milky extract is poured from the solid fat and filtered to produce a clear solution containing not over 20% alcohol. It constitutes a coconut flavoring extract of many uses.

Separated fat is liquefied and filtered to produce a colorless and almost odorless and tasteless coconut oil. The protein-solids residue is added to the comminuted, extracted meat which may be used as a food. —U. S. Patent 2,712,502, July 5, 1955.

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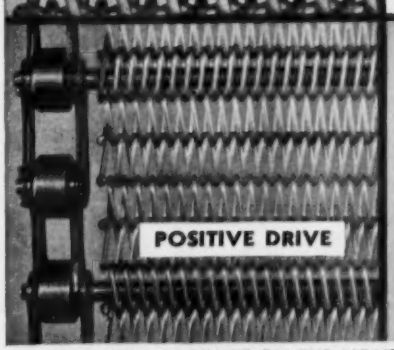

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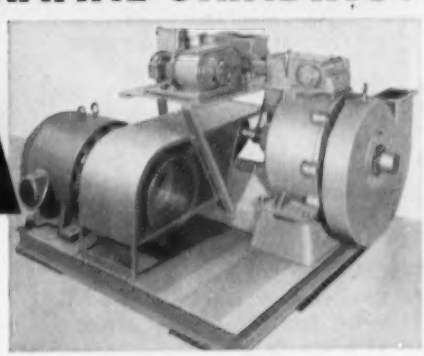

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Passion Fruit Juice

—*Continued from page 94*

and dried flower parts. In initial pilot plant processing, stems have been cut off by hand at the washing operation.

The juice is enclosed in sacs that surround the seeds. This pulpy mass is further enclosed in a rind that is harder and smoother than that of a lemon. Thus, to separate pulp and seeds from the rind, the fruit must first be sliced.

Unique Extracting Method

Cutters with revolving, circular knife blades—spaced ½ to ¾ in. apart—perform the slicing operation that reduces the fruit to flat segments. Cutter may be fed by hopper or moving belt. And it is elevated so that slices chute by stainless steel trough directly into the top of the centrifugal extractor.

Here, rotary force causes seeds and juice to go through perforations in the outward-sloping sides of a spinning stainless steel basket. Empty rind segments slide to the basket rim and are thrown into an outer compartment, then leave via two discharge spouts. Operation is continuous.

Extracted juice and seeds collect in a stainless steel pan located below the centrifuge basket. From here they are pumped or conveyed to a paddle finisher where seeds are removed. In this equipment, standard steel paddles are replaced by neoprene rubber beaters that are held in place by wooden or metal cleats. Finisher is fitted with 0.033-in. perforated screens.

Because there is some breakage of seed tips, juice is then put through a second finisher equipped with 60- or 80-mesh screens to remove specks.

Since aroma and flavor are volatile—thus lost in conventional heat-techniques—the final step in manufacturing is fast freezing after canning.

Quality Standards

While it is much too early to establish firm quality standards for passion fruit juice, tentative values for some factors have been measured on enough samples to establish a range (see table). Free and suspended pulp and seed-speck count in the finished product are two other quality aspects under current study.

Seed fragments in the juice are harmless, but unsightly. New methods of extraction and seed removal may prevent the breakage, but the present two-finisher operation offers a satisfactory solution, reducing large specks by 85-90% and total specks by 60-70%.

A consumer-acceptance survey in one or more mainland cities is planned for 1955. If the results show a promising market, growers and processors can increase production at least ten-fold in one year, since a full fruit crop can be harvested nine months to one year after vine planting.

It is planned to market the new product in 6 oz. cans.

End (Resume reading on page 95)

Triggered by Heat

—*Continued from page 61*

to what is entailed with dicalcium phosphate.

Thus, as might be anticipated, the new way calls for formulation adjustments to adapt to the unique absence of leavening gas during batter preparation.

One particularly successful adaptation is marked by the inclusion of sufficient air in the batter to make up for the absence of carbon dioxide gas. It should be realized, however, that if more air is included in the batter, the combined force of heat-expanded air and CO_2 generation from the bicarbonate may be too great a force for the flour quality.

And so it is suggested that the amount of chemical leavening be reduced if the air leavening is increased, in order to avoid the undesired characteristics.

Another approach to formula modification works on a principle similar to that of double-acting baking powder. This is to blend some fast-acting acid leavening with the stabilized dicalcium phosphate. The choice of this approach over the air-inclusion method depends on the intended application.

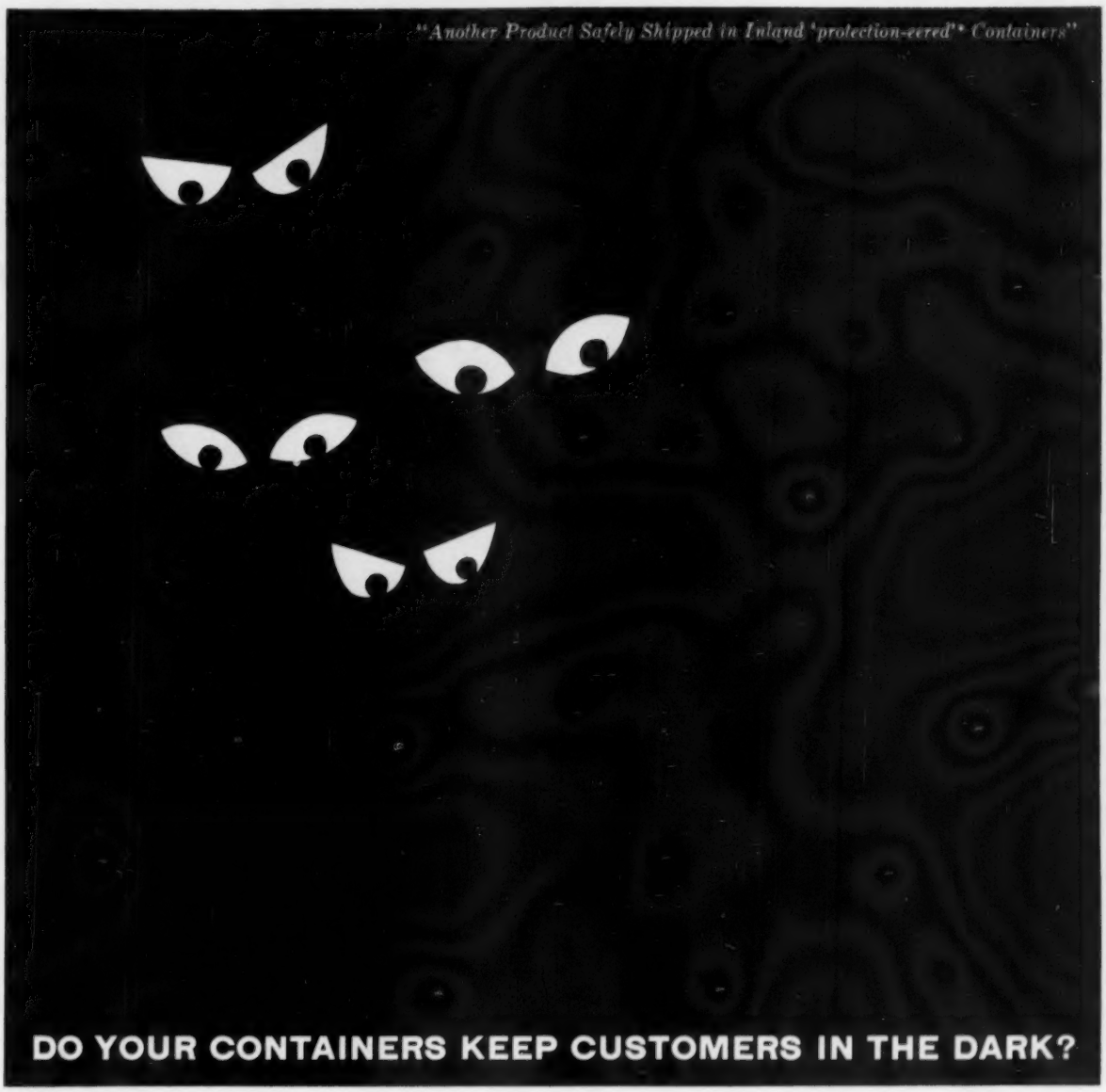
Still another helpful formulation modification is to use a little more sugar and possibly more shortening (insofar as cost limitations permit). Inclusion of additional sugar would also be expected to increase preservative characteristics in refrigerated cake batters. Also, a slightly slower baking (30 min. at 325 F. for a standard 8-in. round cake) assists in getting a maximum release of carbon dioxide before the batter coagulates.

As an additional aspect, use of stabilized dicalcium phosphate might enable the commercial baker to schedule making of his batters and doughs in the morning—to be baked later as needed or as convenient.

Also, the relative inertness of this material during storage of refrigerated cake batters suggests the possibility of increased storage life of the leavening system in prepared dry mixes made with rather moist flours.

End (Resume reading on page 62)

"Another Product Safely Shipped in Inland 'protection-ered' Containers"*



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Questions & Answers

THIS MONTH'S PROBLEM

Preparing Deviled Crabs

Question—In the Nov. 1954 issue of FOOD ENGINEERING (p. 99), you had an article on a frozen deviled crab operation. However, in it, there were no directions for making this product. Will you, therefore, furnish me with formula and directions for manufacturing pre-cooked deviled crabs that are to be packaged in consumer-size cartons and then frozen?

JULY PROBLEM

Water Softening Problem

The Question Was—A few years ago, we installed a wood cooling tower and closed-circuit recycling system to cool water for cooling canals in our cannery. Soon, we experienced scaling in the system, which our laboratory analyzed as calcium carbonate. We put in a zeolite softener and eliminated the scaling. But now, we find that the wood in the cooling tower is showing signs of deterioration. We are also troubled with spongy porous deposits, which seem to be highly insulating. Can you suggest corrections for these operating difficulties?

Answer—Water treatment is such a complex subject that you may find it to your advantage to call in a consultant specializing in this branch of industrial chemistry. We can, however, suggest possible causes for the two troubles you mention, and corrections for these possibilities.

It seems quite probable that your zeolite softening is producing high enough alkalinity in your water to cause "delignification" of the wood in the cooling tower. When lignin is removed, cellulose fibers of the wood are no longer sufficiently bound, thus deterioration occurs. If this is your trouble, we would suggest reducing the alkalinity by acid treatment—taking care not to make the water acid enough to corrode the metal in the system. Or you can change your softening system to a lime method and bring the pH value below 8.2.

It seems likely that deposits you are experiencing may be organic in nature. It is characteristic of these deposits to be rather bulky and porous and, therefore, quite insulating in their effect. Commonest method of combatting such organic growths is by chlorine treatment. It is supposed to be more effective to dose the water with chlorine at intervals, rather than continuously.

This technique prevents any of the organisms responsible for the deposits from building up a tolerance to the chemical. Between chlorine doses, the deposits will slough off, and you can determine from experience about how often to apply them.

Chlorine treatment may also be of some benefit to your wood tower if any of the deterioration is due to fungus growth. However, excessive chlorine dosages must be avoided as they will also cause delignification.

More on July Problem

Deterioration of a wood cooling tower is a serious commonly encountered problem. Chemical attack rather than decay is generally responsible for deterioration.

Should more than one type of attack be active, then identification is diffi-

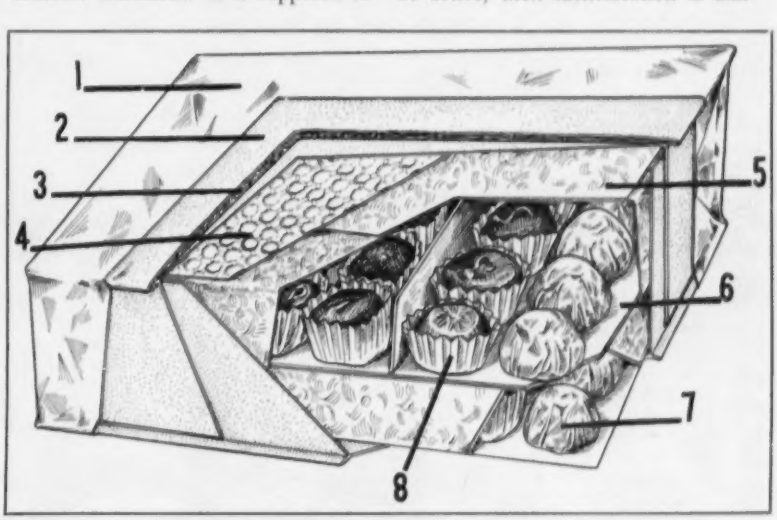
How Would You Do It?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise.) We pay space rates.

What is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.



Package Protects Candies in Freezer Storage

Question—In the June issue of FOOD ENGINEERING, you had an excellent article by J. G. Woodroof on freezing candies. Would it be possible for the author to provide us with some of the essential features of a package for protecting assorted candies from drying out and becoming mechanically injured during freezer storage? And would such features of a package protect these candies from condensation and sugar bloom upon removal from freezer storage?

Answer—Dr. Woodroof has furnished us with this drawing of a suggested package. Pointed out are the essential features numbered in drawing:

(1) Overwrap with sealed edges, which protects box and contents against any gain or loss of moisture.

(2) Chip-board box (telescope style with extended edges protects candy from damage during handling.

(3) Cushion in lid safeguards box and candy from mechanical injury and adds insulation.

(4) Padding tissue, with high moisture absorbing properties, protects candy from condensation.

(5) Inner liner with both end and side folds, protects candy against moisture change. Not needed if suitable overwrap is used.

(6) Divider separates layers of candy.

(7) Individual wrapper prevents losses of moisture and flavors from candies.

(8) Candy cup keeps individual pieces of candy from rubbing together.

cult for the layman—and even for the wood expert. However, in cooling towers, deterioration is generally "delignification" resulting from continuous and long exposure to alkaline circulating water.

Deterioration due to acids is not common, since the water is usually alkaline. Oxidizing agents similar to chlorine may also cause wood deterioration.

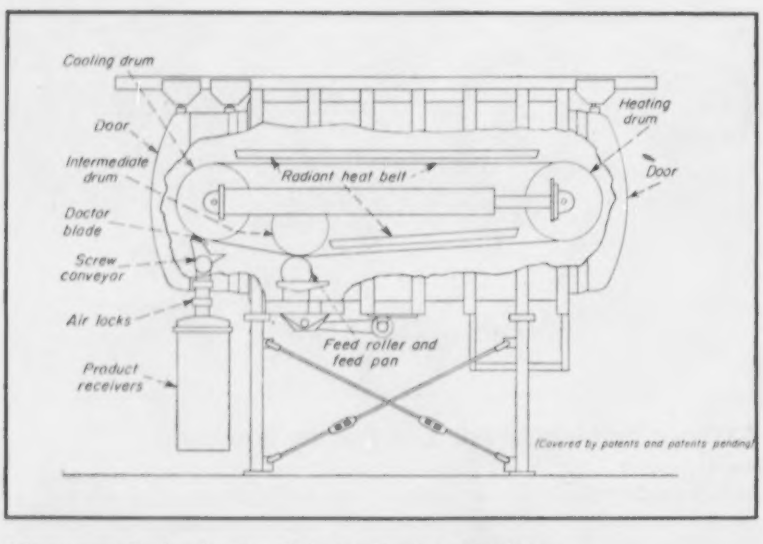
Question points out that a zeolite softener had been installed. Undoubtedly, installation of this softener resulted in higher alkalinity in the circulating water, particularly increasing the sodium carbonate or bicarbonate content. Chemical reactions in cooling tower water are generally controlled through water-treating practices.

At least one cooling tower manufacturer recommends that the concentration of sodium carbonate or bicarbonate compounds be kept below 100 ppm. and the pH not over 7.5.

The "spongy porous deposits" described in the question would appear to be due to algae. Various types of treatments with algicides will kill off algae. In using an algicide, operator should keep in mind the importance of applying it as a "shock" rather than continuous-feed treatment. Reason is that algae build up a resistance to the algicide when it is fed continuously and the benefit may be lost.

Several large water-treating organizations have services available for controlling these conditions. At least one firm specializes in consulting engineering service that would help this operator set up a practice of water treatment to control this condition.

Also, a cooling tower manufacturer has set up a program for treating wood in cooling towers to control decay. Should the deterioration be identified as decay, then the treatment might be well in order. Since it is difficult for the ordinary cooling tower operator to apply this treatment, the manufacturer has set up a service whereby towers can be treated against decay on a contract basis.—*Edward F. Wehlage, Professional Engineer, Fairport, N. Y.*



Vacuum Dehydrator Solves Drying Problem

In answer to the question of "Drying a Difficult Item" (FE June, p. 186), our company has been investigating high vacuum, low-temperature drying of foodstuffs for a number of years and has successfully dried a large number of products.

Among foods successfully dried by this process are: Soups, citrus and other juices, tomato paste, tea, coffee, molasses, cereal beverages, milk products, malted milks, and many others.

The drawing illustrates our pilot plant vacuum dehydrator, which is approximately $\frac{1}{10}$ the capacity of the commercial unit (FE Mar., p. 71). High vacuum (1 to 10 mm. Hg abs.) and low temperature (140 to 300 F.), coupled with variable exposures (seconds to several minutes), makes this vacuum dehydrator ideally suited for drying heat-sensitive, oxidation-susceptible, thermo-and pseudo-thermo plastic materials.

Briefly, here's how these dehydrators operate:

Liquid product is pumped into dehydrator-feed pan and is applied to moving belt through action of the feed roll. Layer thickness applied to belt is predetermined and can be varied by: (1) Clearance between feed roll and belt (0.010 to 0.060 in.), (2) belt temperature leaving cooling drum, and (3) viscosity and other properties of liquid feed.

Layer of applied material then travels under the first zone of radiant heat, which has a capacity of a few to 20 or 30 kw. After passing this pre-conditioning zone (to speed up evaporation), material approaches the heating drum, where accelerated drying occurs. After leaving heating zone (where 70-90% drying occurs), it passes under final zone of radiant heat. Here, product is reduced to its final moisture content.

As the product passes over the cooling drum, it is conditioned for doctoring from belt. Many products, especially those having a high sugar content, are semi-plastic after leaving the final heating zone and must be solidified before doctoring. The cooling drum also serves to cool the belt to desired temperature so as to render it in the proper condition for new feed application.

Belt speed varies from a few to several hundred feet per minute. Heating zones are variable and easily controlled. Cooling drum temperature is also variable. Entire process is conducted under high vacuum, which is maintained and controlled by steam jets.—*F. Fixari, Chemical Engineer, Chain Belt Co., Milwaukee.*

Q.—Do you know how we can prevent caking of carton-packed confectioner's sugar?

A.—Simply add 3% corn starch to your sugar.

Drying Question Again

Here's another answer to the problem: Drying of hygroscopic food products has been successfully done with radiant heat using "near" infrared sources (short wave length such as the output from a tungsten infrared lamp). Use of short wave length radiant energy is advantageous in drying of this type, since it penetrates below the surface of organic materials. Thus, the entire mass is quickly heated, and thorough drying is obtained in a minimum of processing time.

To avoid heat damage as product approaches dryness, provision should be made in design of the drier or oven to reduce intensity of radiation so that product temperature does not exceed the critical point. This is standard procedure on well engineered equipment where product requirements so dictate.

The dust problem referred to would undoubtedly be minimized in an in-

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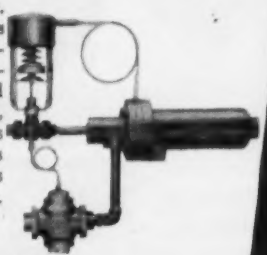

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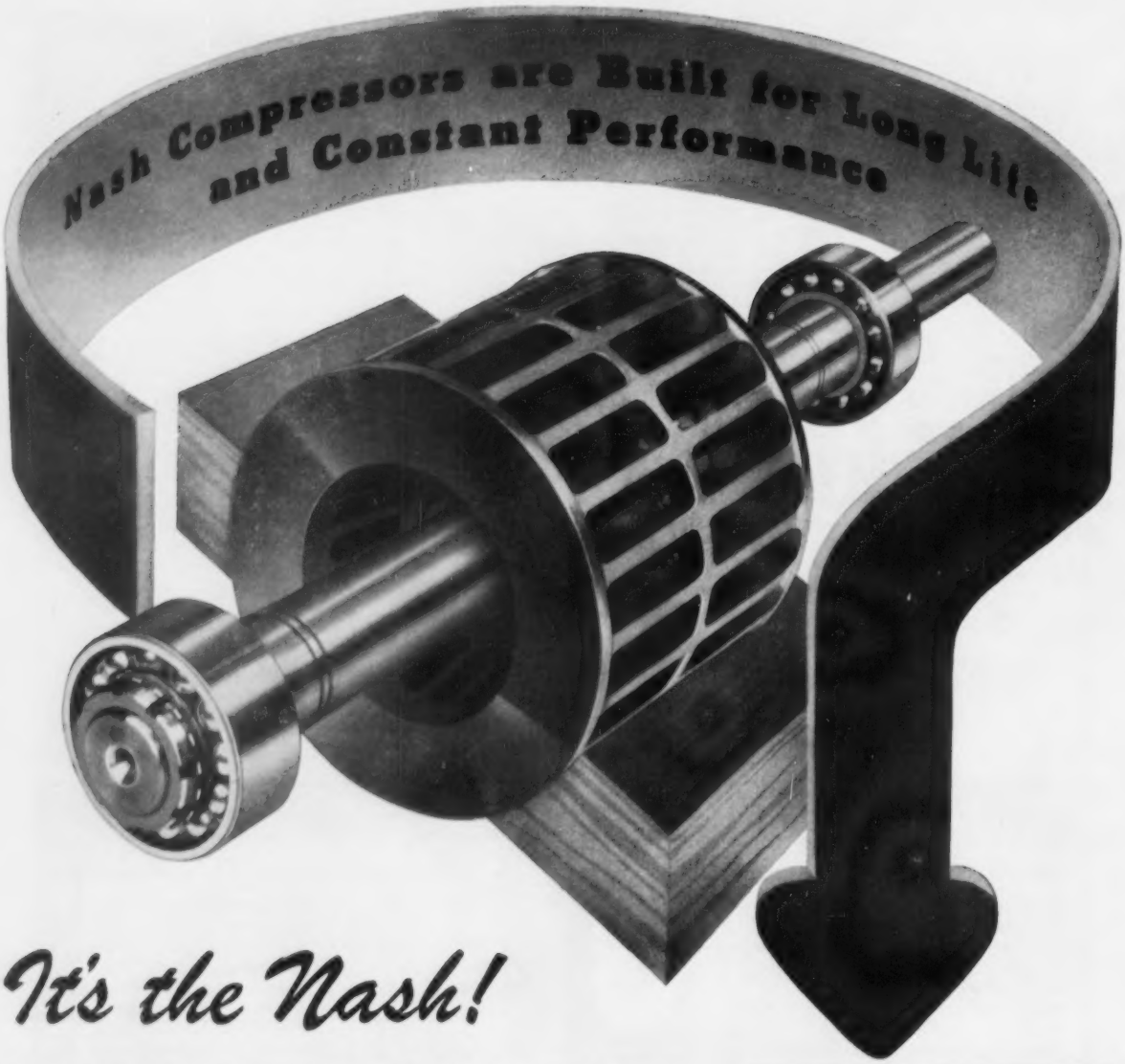

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frared oven as compared to a convection oven, since the latter requires considerable air movement to affect heat transfer whereas radiant heating does not. In practice, however, it is necessary to exhaust the moisture as it is released from the product, but air requirements are relatively small.

To cite a particular case, a cereal manufacturer dries an exploded corn meal product from 12% moisture down to 3% or less in approximately 2 mins., using an infrared oven. Cereals are processed on a continuous basis, using an open wire-mesh belt conveyor moving through the drier. The drier is 11 ft. long, rated at 24 kw., and has a capacity of approximately 150 lb. per hr.

Successful drying with any medium depends upon uniform distribution of energy. A common pitfall in trying to use infrared heat has been to use reflector-type lamps that emit a highly concentrated narrow beam of energy. The most satisfactory and widely used means of obtaining good distribution from an infrared lamp is to use a clear G-30 type lamp, backed up by a separate metal reflector designed for wide angle distribution.

High efficiency is obtained by making the oven interior highly reflective to radiant energy. The use of moisture-proof lamps is indicated in drying applications. This eliminates the possibility of lamp breakage due to condensation.—*Warren F. Carlin, The Fostoria Pressed Steel Corp., Chicago.*

Q.—Do you have any instructions on how to produce prepared horseradish?

A.—Clean horseradish roots in a rotary type washer. Scrape off outer brown skin by hand or with an automatic vegetable peeler. Now run cleaned roots through a chopper or grater. Immediately cover grated horseradish with a solution consisting of 3¼ oz. of salt dissolved in 1 gal. of 40 gr. vinegar. Fill into bottles and cap.

More on Stabilization

Referring to your "Stabilizing Problem" in the June issue of FE (p. 194), we suggest that 1% of RASM grade of Glidden soybean lecithin (based on the weight of the cocoa) be used. Preferably, the cocoa should be premixed with the lecithin. This way, lecithin coats the cocoa particles. Then add the cottonseed oil.

This grade of lecithin is a fraction of the soybean phosphatides which shows the most efficient properties in dispersing solids. It is recognized that other grades of lecithin manufactured by our company and others probably would do a somewhat similar job, but according to our information, the best available results will be obtained in the manner we have suggested.—*H. T. Iveson, The Glidden Co., Chemurgy Div., Chicago.*

Baked Meat Balls

Question—I am a chef operating a cafeteria in a large midwest food plant, and would like directions for making baked meat balls. Will you help me?

Answer—Mix in order given:

Ground beef, 25 lb.; ground veal, 25 lb.; ground pork, 25 lb.; bread crumbs, 6 lb.; nonfat milk solids, 4½ lb.; eggs, 4 lb.; salt, ¾ lb.; ground pepper, 1½ oz.; grated carrots, 1½ lb.; and water, 9 lb.

Measure mixed, seasoned meats with No. 16 ice cream scoop, and place portions in roasting pans. Slowly bake 1 hr. in 350-F. oven.

If you wish, cover meat balls during last ½ hr. of baking with gravy or mushroom sauce. Or, if desired, add 5 to 10 lb. of grated onions to batch.

—*End*—

Egg Solids Report

—*Continued from page 85*

the number of bacteria. Actual heat applied to the egg during spray drying is relatively minor, since evaporation of the small particles keeps them cool. Thus much of the bacterial reduction must be due to oxidation.

And while poultry are a natural reservoir for salmonella organisms, the level of such contamination in most commercial egg solids is less than one such organism per gram.

4—Organoleptic Qualities

Egg products have received considerable attention in the matter of color, flavor, and odor. Feeding has a definite effect on yolk color. As more green feeds are consumed by poultry, yolk color is increased.

But there is this problem for the egg processor: Whereas consumers of shell eggs prefer a light yolk, users of egg products prefer the dark.

Feeding can also alter the odor and flavor of eggs—but careful practices have now reduced this to a minor problem.

Flavor of shell eggs is also effected by holding and storage conditions. Eggs are susceptible to warehouse contamination when stored close to odoriferous materials. Recent improvements in warehousing have essentially eliminated this problem. Recent researches have shown that shell

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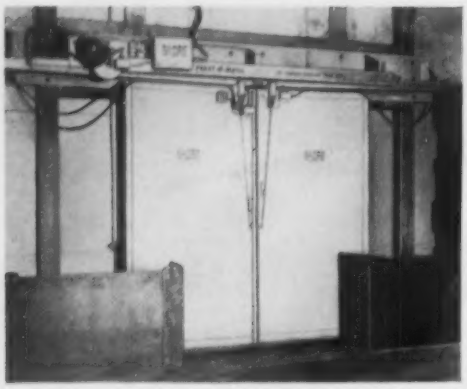

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eggs can be held several months under proper conditions with no deterioration in flavor.

Of most concern have been flavor and odor changes brought about by microbiological development. These have been traced to improper freezing and thawing of frozen egg products. Control of these odor and flavor changes in yolks and whole eggs can be achieved by pasteurization. In this case, bacterial counts are greatly reduced and the freeze-thaw factor becomes less critical.

Spray drying generally results in egg products of improved organoleptic quality, since many odors are removed with the other volatile constituents.

5—Functional Performance

A primary use of egg yolks is for emulsification. Chief example of this property is in the manufacture of mayonnaise.

Yolks also act as an excellent foamer in a product such as sponge cake.

A third key property of egg yolks is the heat coagulation of the proteins. They begin to coagulate at about 150 F., and the rate of denaturation increases very rapidly with the temperature.

Use of egg whites in the candy and bakery trades is based primarily on the foaming ability of the egg white, but equal importance must be given the heat coagulation property of the proteins.

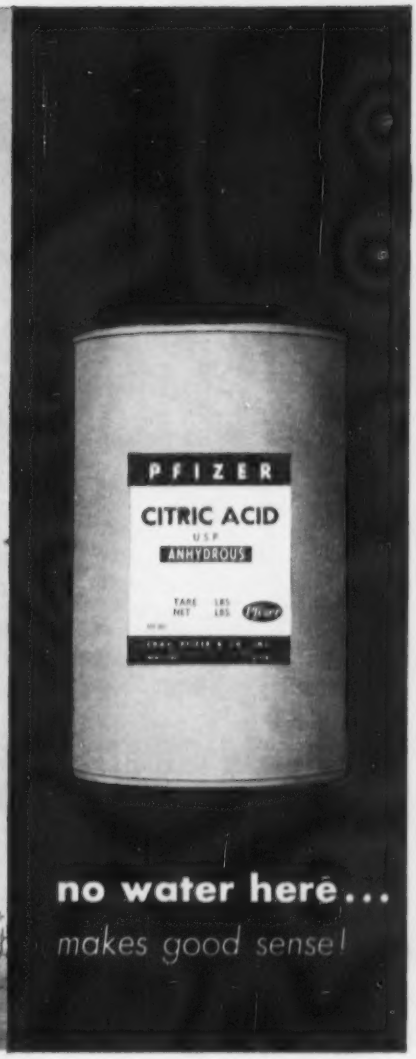
Major proteins in egg whites are: Ovalbumin, 65.0%; ovomucoid, 9.0%; globulin, 9.0%; conalbumin, 14.0%; ovomucin, 1.6%; and lysozyme, 3.4%.

In baking, globulins primarily lower surface tension to the point where rapid air incorporation and initial foam formation are carried out. As the foam develops, the ovomucin surface denatures and begins to form a solid film which contributes to the stability of the unheated foam.

Finally, the heat-coagulable ovalbumin sets up in the oven to a solid structure supporting egg white along with considerable quantities of sugar and flour—as in an angel food cake.

Particular acknowledgement is made by the author to the following persons for their assistance in the collection of material and photos for this Special Report: Edna Carson, Egg Solids Council, Chicago; C. R. Piowaty, The Emulsol Corp., Chicago; C. B. Hartman and R. H. Forsythe, Henningsen, Inc., New York City; J. L. Perry and J. G. Odell, Seymour Foods, Inc., Topeka, Kan.; and A. Rose, Tranin Egg Products Co., Kansas City, Mo.

End *(Resume reading on page 86)*



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Useful New Books & Government Publications

Vitamin E References

ANNOTATED BIBLIOGRAPHY OF VITAMIN E, VOL III *Distributed by National Vitamin Foundation, Inc., 15 E. 58th St., New York City 22. 1955. 182 pages. 8¼ x 11 in., paper. Price:* $3.

Covering the period from 1952 to 1954, this is the third volume in a series designed to provide a guide to the latest developments in the science of Vitamin E. Almost 1,000 scientific communications are listed.

The listings are divided into seven sections: occurrence and distribution, determination, chemistry, physiology and pathology, pharmacology, nutrition and metabolism, and medical and therapeutic use. An index of authors is included.

Today's Management

A GUIDE TO MODERN MANAGEMENT METHODS. *By Perrin Stryker. Published by McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York 36, N. Y. 1955. 300 pages. 5¾ x 8¾ in., cloth. Price:* $3.50.

Since the end of World War II, management methods in business and industry have undergone drastic changes. The wave of new techniques has been traced carefully and in great detail by the staff of *Fortune* who pooled their information under the editorship of Mr. Stryker. A respected authority on management and its problems, he attempts to clarify, for the working executive, the processes and problems of modern management.

Such diversified facets as labor-management relations, executive retirement, and corporation management are treated with care and an honest statement of the facts. Possible solutions are discussed and applied to present day management requirements.

You and Your Trademark

TRADEMARK MANAGEMENT *Published by United States Trademark Assn., 522 Fifth Avenue, New York 36, N. Y. 1955. 130 pages. 6¾ x 9¼ in., cloth Price:* $5.

The result of three years of work by a USTA committee, book is a comprehensive and valuable study of a complex field. Though written by experts in the trademark field, the book is directed specifically at businessmen.

In the food industry, where trademarks are of particular importance, the book should find a ready market. The relation of the trademark to management is of interest, as well as avoidance of costly errors, and suggestions for the protection of trademarks.

Included in the volume are the policy steps of selection, registration, correct use, protection, policing, difference between a trademark and a trade name, and the problems of a U. S. trademark in foreign markets.

The Electronic Brains

ELECTRONIC DATA PROCESSING IN INDUSTRY *(Special Report No. 3) Published by American Management Assn., 330 W. 42nd St., New York City 36. 1955. 256 pages. 6¾ x 9¼ in., paper. Price:* $7.75. *($5.75 to members).*

Designed to serve management as comprehensive report on "the office revolution", this book discusses the speed, accuracy, controls, and savings possible with electronic data-processing.

Practical and detailed data are presented on: When electronics can be useful, how to plan applications, types of electronic equipment available, and how the "electronic brains" are currently being used by pioneering firms.

Included in the book are company reports on the use of the equipment, a summary of data processing and its effect on company organization, a forecast of future developments, and a complete glossary.

ELECTRONICS IN BUSINESS. *Published by Controllership Foundation, Inc., 2 Park Ave., New York City 16. 1955. 176 pages. 6 x 9 in., paper. Price:* $2.

This annotated bibliography is a handy timesaver for executives interested in "reading up" on some particular phase of electronic systems and their applications in business.

Listings of papers, speeches, and visual presentations are supplemented by essential facts on current electronic data-processing systems. Equipment in use is listed by company. A complete directory of commercial digital electronic computer centers available to management is also included.

The second in a series on accounting systems and procedures, the book is a revised and enlarged edition of an earlier work, "Business Applications of Electronic Machines."

Insecticide Safety

ANALYSIS OF INSECTICIDES AND ACARICIDES *By Francis A. Gunther and Roger C. Blinn. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York City 1. 1955. 696 pages. 6¾ x 9¼ in., cloth. Price:* $14.

Anxiety concerning the possible presence of harmful amounts of persisting insecticides in foods grows out

FE REPRINTS AVAILABLE

Listed below are special sections, flowsheet book, and articles from past issues of FOOD ENGINEERING which are available in reprint form. Single-copy prices are listed. For orders of 20 or more, there is a 25% discount. You order the reprints by circling the corresponding numbers on the Reader Service Coupon, inside the back cover. You will be billed when your order is filled.

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Six articles of practical value: (1) Flexibles Are Revamping Packaging Pattern. (2) How To Avoid Damage in Shipping. (3) Bundling Frozen Foods. (4) One-Portion Packets. (5) Automatic Packaging Line. (6) Paper Vs. Glass.

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Eight articles on significant developments: (1) High Frequency Looms as Improved Cooking Method. (2) New Twist in High-Short Retorting. (3) Full-Flavor Concentrates by New Recovery Technique. (4) From Orchard to Cannery—Under Water. (5) At Gerber's Quality Control Reigns Supreme. (6) Bulk Brining Spells Big Benefits to Canner. (7) Top-Notch Tomato Processing Operation. (8) Dual Tomato Cannery—How It Ticks.

6. Book of Flowsheets.....$2.00

Few copies of 1949 edition still available. It contains 130 process charts covering a wide variety of food manufacturing operations. Charts are accompanied by brief descriptions of the processes.

7. Preventive Maintenance.....$0.50

An 8-pager packed with information that will help to minimize costs, reduce down-time, and promote quality through more effective maintenance.

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"Moisture in an insulation means trouble. It cuts efficiency, destroys insulating value. We use FOAMGLAS because its sealed glass cells can't absorb moisture. It gives us constant protection without expensive maintenance.

"Removing the moisture problem also helps prevent refrigerating odors in our stored food. Rodents are no problem since the insulation is vermin-proof."

Mr. Bryner concludes: "We've had perfect service from the FOAMGLAS we installed in freezers, coolers and on piping last November. We anticipate many years of maintenance-free insulating protection with it."

Take a tip from John Bryner and the Roosevelt Hotel. Let cellular, *stay-dry* FOAMGLAS give *you* perfect protection for your insulated spaces, piping and equipment. Write for a free sample and our literature containing complete details on this remarkable insulation.

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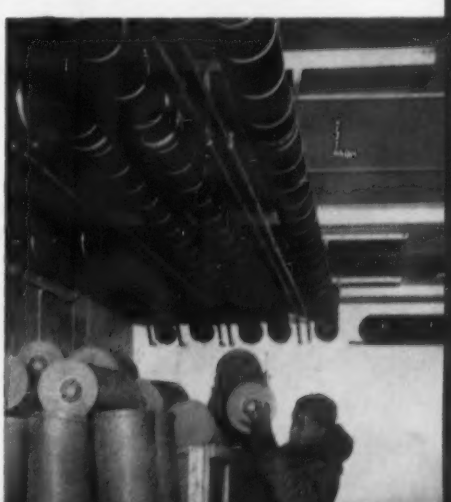

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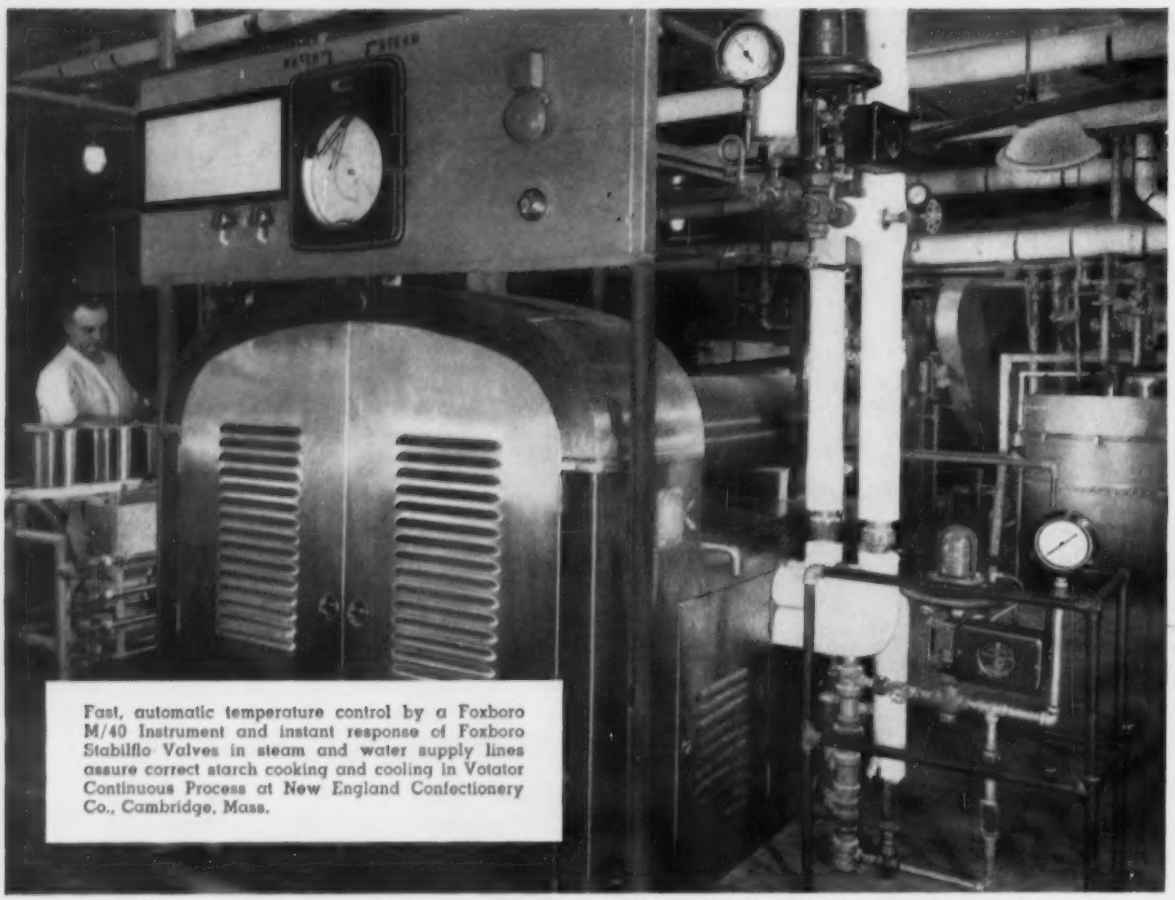

Fast, automatic temperature control by a Foxboro M/40 Instrument and instant response of Foxboro Stabilflo Valves in steam and water supply lines assure correct starch cooking and cooling in Votator Continuous Process at New England Confectionery Co., Cambridge, Mass.

Precise Foxboro Control on equipment permitting a higher cooking temperature has enabled the New England Confectionery Company to switch from batch to continuous processing of starch jellies . . . with a 95% saving in cooking time.

This rapid process, which also greatly improves gel strength, shelf life, and clarity, is carried out in a Votator Heat Exchanger†. A sensitive, fast-acting Foxboro M/40 Controller maintains pre-set cooking and cooling temperatures by automatically adjusting valves in the steam and water supply lines. Regardless of changes in steam, starch, or water flow, the M/40 Controller holds critical temperatures *exactly* . . . protects the uniformity and quality of up to 4000 lbs. of starch jelly per hour.

Many other food processors now depend on Foxboro Control Systems to maintain premium product quality at lowest operating cost. Write for information on better control for *your* process.

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INSTRUMENTS THAT IMPROVE PRODUCT UNIFORMITY

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

of the fact that most of the new insecticides, having an oil or wax base, will not remain on the surface when applied. Then, when fed to warm-blooded animals, they may be deposited in fatty tissue with a danger of future mobilization.

Official concern has grown over the analytical activities needed to determine the residue of insecticides and acaricides. Until official standards are set, the food man must rely on his individual analysis for guidance. This book is designed to stimulate research and encourage members of the food industry to give the problem the close attention it deserves.

Book is divided into three sections: Problems in securing quantitative residue data, problems in analyzing technical grade materials and formulated products, and sampling, measuring, processing, cleanup, and analysis.

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ESTABLISHED OPTIMUM CONDITIONS FOR STORAGE AND HANDLING OF SEMI-PERISHABLE SUBSISTENCE ITEMS. *Published by Quartermaster Food and Container Institute, Chicago 9, Ill. 130 pages, paper. No charge.* Proceedings of a symposium.

KNOW YOUR PACKAGING MATERIALS *(No. 46 in Packaging Series) Published by American Management Assn., New York City 36. 123 pages, paper. Price:* $1.75 ($1 *to members).* Discussion of foils, paper, films, boxboard, and foam plastics.

DIRECTORY TO LOUISIANA SEAFOOD DEALERS. *Published by Louisiana Wild Life and Fisheries Commission, New Orleans. 40 pages, paper. No charge.* Alphabetical arrangement of product includes processors' name, address and telephone number.

GETTING THE MOST FROM RESEARCH AND ENGINEERING. *Published by American Management Assn., New York City 36. 59 pages, paper. Price:* $1.75 ($1 *to members).* Organization and administration of the important research and engineering functions, including new product development.

UNITS OF WEIGHT AND MEASURE—*Definitions and Tables of Equivalents (Miscellaneous publication 214). Published by Government Printing Office, Washington, D. C. 64 pages, paper. Price:* $.40. Defines units of length, mass, area, volume, and capacity in use in the U. S.

NEW POTENTIALS IN CONSUMER PACKAGING *(No. 48 in Packaging Series) Published by American Management Assn., New York City 36. 98 pages, paper. Price:* $1.75 ($1 *to members).* Meat, produce packaging.

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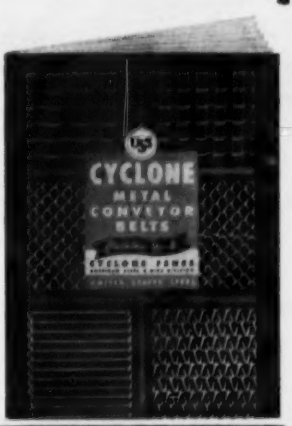

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Sugar-Free Beverages Now Legal in All States

Passage by two states—Utah and Ohio—of laws permitting sale of beverages sweetened with non-caloric products has removed the last of the state barriers to use of cyclamate in soft drinks.

This development climaxed a four-year effort on the part of Abbott Laboratories to permit use of Sucaryl (its brand of cyclamate) in soft drinks. At the outset, 33 states had laws or regulations prohibiting use of non-nutritive sweeteners.

Under the Ohio law—effective Aug. 30—labels must specify type of sweetener and indicate how much of drink's total weight the calorie-free ingredient comprises.

New Price vs. Jap Tuna

In an unprecedented, voluntary action, the American Tunaboat Assn. has initiated a $40-per-ton slash in domestic fresh-tuna prices to Southern California canners.

Boat owners and their employees have taken the step to meet competition that has developed from Japanese frozen tuna.

The new price, $270 per ton, is the lowest figure for domestic tuna since OPA controls were removed after World War II.

AIB Pushes Technique For Safe Meringues

Growth of food poisoning bacteria in meringues is subject of a recent special bulletin (No. 84) released by American Institute of Baking, Chicago.

Present concern by both state and U. S. public health services led the Institute to investigate the hazard. And it has now developed a technique using several useful practices to curb danger in meringue-topped bakery products.

Specifically, bakeries are urged to use only good quality egg whites, and where frozen whites are utilized, to thaw them under cool conditions. The Institute further advises making the meringue by the hot process, using a concentrated sugar syrup. Here, high temperatures are said to kill bacteria.

Buttons Govern Case Flow

Food containers speed at 25/minute from production lines to palletizers in response to switch-and-dial impulses from this electronic control pulpit at H. J. Heinz Co., Pittsburgh. For any specific product, operator actuates proper pallet-loading pattern by pushing button. Electric eye stops flow when required number of units has passed. Pulpit (of Lamson make), central control panel, and warehouse foreman are connected by a three-way plant intercommunication system to coordinate operations.

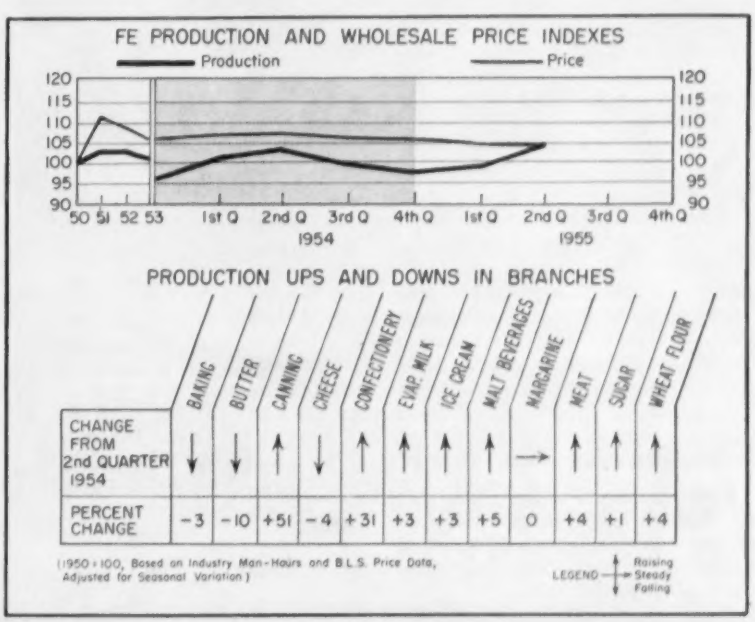
Frozen Foods Rise High; New Items Are Credited

Mid-year checking of the frozen-food picture reveals that '55 sales are running a strong 15-20% ahead of a year ago—instead of the earlier predicted 10-15%.

The extra climb is pointed out by Sam Vogel, president of National Frozen Food Distributors Assn., who now finds that the forecast of these foods surpassing a $1½ billion scales volume in '55 "appears to be an understatement."

Spurring the increase, he says, is the recent introduction of many new frozen foods, mainly of the heat-and-eat variety. He particularly cites the continuing rise of fish sticks. Sales of this popular item during the first six months of this year are calculated at 34.5 million pounds—a gain of 54% over the '54 first half.

Meanwhile, lack of adequate zero cabinet space in the nation's stores goes on hobbling frozen food growth. Space expense, too, is a big factor. For whereas conventional shelving for most other foods runs about $1 a foot, the cost per foot in frozen food cases hit $100.



SECOND QUARTER REPORT on '55 shows production rising 6 points to a new high level of 105—2 points above the peak reached a year ago. (Note that this climb brings output and wholesale price lines together.) Prominent in the breakdown by branches are the strong canning and confectionery figures.

Giant Milk Vendor

Plans for marketing this Gargantuan outdoor milk-vending machine are now complete, announces Pure-Pak Div., Ex-Cell-O Corp., Detroit. New 19-ft. high unit has a working capacity of either 400 half-gallon containers or 500 quart cartons, with extra storage room in reserve. Thorough insulation and a heavy-duty refrigerating unit keep product at 34-36 deg. Special "round-table" device delivers cartons to self-service opening.

Sliced Butter Makes Debut

Portion control has now hit full stride in the butter business with the advent of a sliced quarter-pound bar, marketed by Hotel Bar Foods, New York butter distributors.

In this new operation, each 4-oz. bar is cut into 16 patties before being parchment wrapped in the usual manner. And, method is said to cost no more than preparation of the previous solid package.

The special slicing equipment—designated 'Slicepac' by the designer and manufacturer, B. Redmond & Sons, New York—is engineered to fit exactly between extruder-former and wrapping section of a Lynch 'Morpac', Model-T' print-forming and wrapping machine. Slicer drives from the main machine shaft and adapts to the twin-line 'Morpac' production rate of 8,800 quarter-pound units per hour.

Who Can Use This Paper?

Development of a new paper that is extremely resistant to passage of liquids and oils—but will pass air freely — has raised the question, "Where apply it?"

Some people think it's perfect for making theater popcorn bags that won't leak grease and can't be blown up and popped. There may well be other food uses for the new material.

Its creator, Riegel Paper Corp. (260 Madison Ave., New York City), wants to know who can use it—and is willing to talk with anyone having ideas on the subject.

Opens Research Reactor

A new irradiation facility has now been put into operation by Argonne National Laboratory, Lemont, Ill., for investigation of radiation effects on foods and other materials.

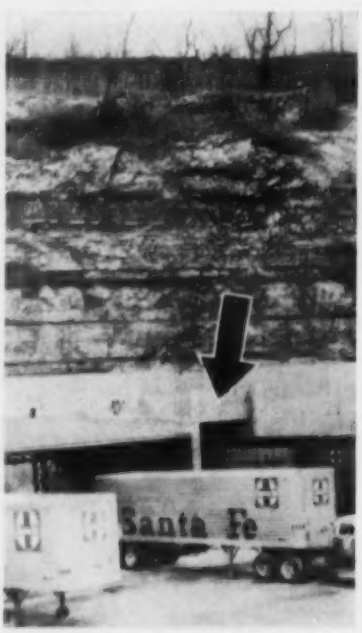
A tank-type installation, it has a capacity of up to 840,000 curies of gamma radiation, and is now available to industrial organizations, educational institutions, and government agencies for research work.

One of the first users will be the Army Quartermaster Corps, which has recently embarked on a wide study of food sterilization through irradiation.

Mellorine Output Up 30%

Production of mellorine-type frozen desserts zoomed to 31,416,000 gal. during 1954, according to USDA. This represents a 30% increase over 1953's output.

The product, now manufactured in 10 states, is made with fats other than butterfat (FE July '54, p 90).



Cave-Storing of Foods

Hidden in this imposing Kansas cliff is 7-acre cavern warehouse of Inland Cold Storage Co. It provides cool accommodations for 2,500 carloads of foods. Arrow indicates rail entrance. And part of 15-truck loading dock is seen left.

To Make U. S. Bow

Plans for U. S. marketing of this Swedish-developed pyramid-shaped milk container this fall are announced by American Tetra Pak Corp., Hope, N. J. Tetra-hedron-type carton is formed, filled, and sealed in a single special machine (FE Sept. '53, p. 48). Maker says new container is sturdier than conventional paper "bottle" and takes up less space, too.

U. S. Atomic Fair to Include Food-Raying How's, Why's

Latest aspects of radiation sterilization of foods will be given attention at the first U. S. Trade Fair of the Atomic Industry, slated in Washington, D. C., Sept. 27-30.

A 3-panel, picture-and-text exhibit by QM Food & Container Institute will be among the many exhibits dramatizing various peacetime uses of atomic power, essential products, and further services for industrial applications.

Complimentary tickets are available from sponsor, Atomic Industrial Forum, Inc., 260 Madison Ave., New York City.

Food Plants Stay Put

While factories of other industries continue their post-World War II moves to new booming centers in the south and west, those of food processing still are remaining in relatively the same locations, according to the McGraw-Hill Department of Economics.

In its first "migration" report since 1948, the department cites the south's abundance of cheap labor, natural resources, fuels, and low-cost federal power as attractions.

Pointed up is the fact that the plant movements are prominent in population and income shifts creating new markets in formerly underdeveloped areas.

Mexican Fish-Meal Plant

Trash fish and shark—formerly a nuisance to Mexican shrimp fishermen—will gain commercial value when a new fish meal plant opens operations at Salina Cruz, Mexico.

USDA Fish & Wildlife Service says company will use an azeotropic extraction process to make the meal for human consumption. Initial capacity will be 40 tons of raw material per day, with plant design flexible for expansion.

Hors d'Oeuvres

▶ Pricing rivets and bolts in terms of steaks and banana splits has gone a long way to reduce small-parts waste at a New York aircraft factory. Quickest way to a worker's cooperation is through his stomach.

▶ **Nearly 10 million meals a day are served to men in the Armed Forces. Some mess.**

▶ Better than a billion dollars worth of food a year goes into the mouths of men in the Army, Navy, and Air Force. And better than a billion complaints come out.

▶ **Ten percent of the military food bill could be saved through better management, says the Hoover Commission. That's nothing to what the Army cooks could save by making their offerings edible.**

▶ Last state barrier to sale of synthetically sweetened beverages has been lowered, by Ohio. Now you can drink no-calorie soda pip instead of pop anywhere.

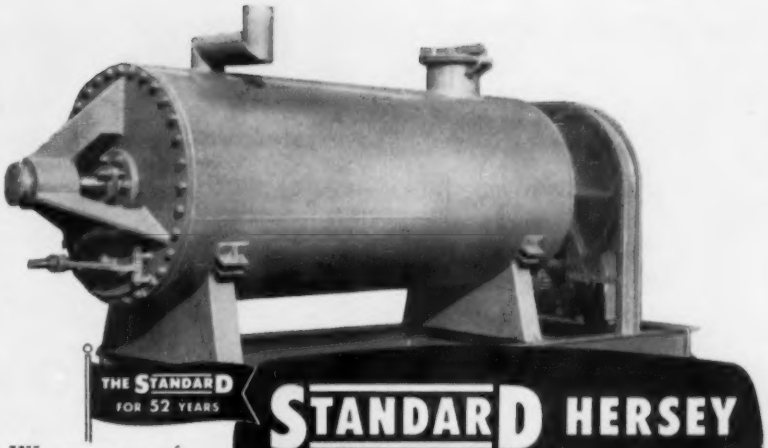
▶ **"Bread is the staff of life, but beer is life itself," says an old English proverb. Yet per capita consumption of the brew in Britain has dropped from about a barrel in 1900 to half a barrel recently. We knew warm beer wouldn't last.**

▶ D. D. Peebles predicts that it may soon be possible to prepare a 7-course dinner, in 7 minutes, from 7 paper packages. Come 11 guests, an you got it made.

▶ **From 187,363 senior girls in more than eight thousand high schools in 48 states, General Mills has selected the Betty Crocker All-American Homemaker of Tomorrow. The award is a $5,000 college scholarship. The result, a pretty lot of publicity. But from the picture of winner Deloris Arnette, Enterprise, Ala., we think her title should be Miss Angel Food of 1955.**

▶ Because of the stigma attached to "chemicals in foods", flavor chemists propose the term "flavomatics" for synthetic organic chemicals used in imitation food flavorings. Tastes good to the ear.

▶ **Some twelve thousand different pesticides are marketed in one of our great food states. This doesn't imply that the place is lousy. But it does mean that users better read the labels.**



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Folsom Directs HEW

Now head of the Department of Health, Education & Welfare, which encompasses the Food & Drug Administration, is Marion B. Folsom, former undersecretary of the Treasury. He replaces Mrs. Oveta Hobby, resigned.

Earlier, Mr. Folsom helped draft the Social Security Act. He also was long associated with Eastman Kodak Co., where he pioneered employee benefit plans.

Calif. Juice for Cartoning

Fresh-squeezed orange juice—being successfully shipped to northern markets from Florida—will now also be delivered to the east from California.

The announcement is made by Andrew P. Young, president of Golden Gift, Inc., Eustis, Fla., which has contracted for large quantities of fresh juice on the west coast.

Company's move was made in order to continue deliveries to customers over a 36-state area following close of the Florida season.

President Young estimates that constantly-rising popularity of the product will boost company sales over the 10,000,000-gal. mark this year, establishing an all-time high for this juice company.

Lemon Powder is Latest

The puff-drying process, worked out on orange and tomato juices (FE July, p. 177), has now been applied with equal success to production of a lemon powder, according to USDA.

Vacuum-dried product is made from lemon juice, sugar, and a trace of stabilized lemon oil. WRUB scientists at Albany, Calif., have conducted the work.

Slate 7 Dairy Courses

Short courses and meetings are slated at following universities and colleges during remainder of year.

U. of Minnesota—Dairy Products Institute, Sept. 21-23; U. of Florida—Dairy Plant Operator's Short Course, Oct. 13-15; Ohio State U.—Market Milk Short Course, Nov. 7-18; Montana State College—20th Annual Dairy Industry Short Course, Nov. 14-16; U. of Maryland—11th Annual Dairy Technology Conference, Nov. 15-16; Texas Technological College—7th Annual Dairy Industry Short Course, Nov. 16-18; Pennsylvania State U.—Ice Cream Course for Dairy Equipment & Supply Men, Dec. 5-10.

To Guide IFT Annual

Named chairman for 1957 IFT annual meeting in Pittsburgh (May 12-16) is Dr. I. J. Hutchings of the H. J. Heinz Co.

Mobile Units Now Service Western Truck-Trailers

The shop comes to the truck-trailer, instead of the trailer to the shop, following assignment of six mobile servicing units at Pacific Intermountain Express Co. terminals.

Designated as "yard doctors", the new wagons each mount a compressor, air tank, grease tank, tire rack, ladder, and three hoses for greasing, inflating tires, and operating pneumatic maintenance tools.

Thus, mechanics now perform all servicing functions right while truck trailer is being loaded or unloaded at the dock. This is stated to save 1 man-hour per trailer on maintenance time required.

Cottonseed Oil Use Up 49%

An all-time record of 1.8 billion pounds of cottonseed oil was consumed in 1954—a 49% increase over 1953—reports the National Cotton Council.

Thus, this oil accounted for 31% of the overall consumption poundage of vegetable oils, which rose to 5.7 billion pounds. Specifically, cottonseed oil's share jumped 8% over the previous year.

Biggest single factor in this climb was increased use of the product in salad oils, dressings, and mayonnaise. Here, 670,890,000 lb. were utilized, a 35% lift over 1953.

Other expanded markets for the oil included shortening, 633,125,000 lb.; margarine, 396,482,000 lb.; and the new mellorine frozen dessert, 5,900,000 lb.

Garber Heads Distribution

Selection of Martin D. Garber of Enid, Okla., as director of the Food Distribution Div. of Agricultural Marketing Service is announced.

Long active in agriculture and a leader of regional food-field associations, Mr. Garber in this new post will direct the national school lunch and special school milk programs. He also will head the distribution of surplus foods acquired by USDA, and he will direct the "plentiful foods" program, which works with the food trades to promote movement of foods to consumers.

World Food Shorts

Bakery premixes, introduced in England only 18 months ago, are becoming increasingly popular. Preference is for chocolate, ginger, and other cakes with pronounced flavor to which fresh eggs are added.

New soluble coffee plant in El Salvador, with annual throughput capacity of 40,000 bags, will be in production early in '56. First of its kind in Central America, it will use the process and technical assistance of Tenco, Inc., Linden, N. J.

A "meal for millions"—comprising a blend of groundnuts (peanuts), sesame, and soya bean cake—will be field-tested, with U. S. aid, by the Institute of Science, Bangalore, India. Three ounces of the new nourishing meal supplies 1,000 calories. It can, in addition be made into flour for baking.

Citrus fruit shrinks less in transit when protected by a thin wax coat, according to recent tests made in Palermo, Italy. Weight loss for coated export lemons was less than one-third of that for the control group.—*McGraw-Hill World News*

Action on Standards

Recent actions by Agricultural Marketing Service (AMS) on U. S. Grade Standards, and by Food & Drug Administration (FDA) on Definitions and Standards of Identity, and on fruit and vegetable pesticide tolerances, with references to the *Federal Register*, include the following:

Lima beans, frozen, amended AMS Grade Standards, July 15 *F.R.*, p. 5051.

Pimentos, canned, amended AMS Grade Standards, July 16 *F.R.*, p. 5091

Fruit and vegetables, extension of effective date for new pesticide residue tolerance regulations by FDA, July 20 *F.R.*, p. 5160, July 28 *FR.*, p. 5391, Aug 4 *F.R.*, p. 5571; Aug. 6 *F.R.*,

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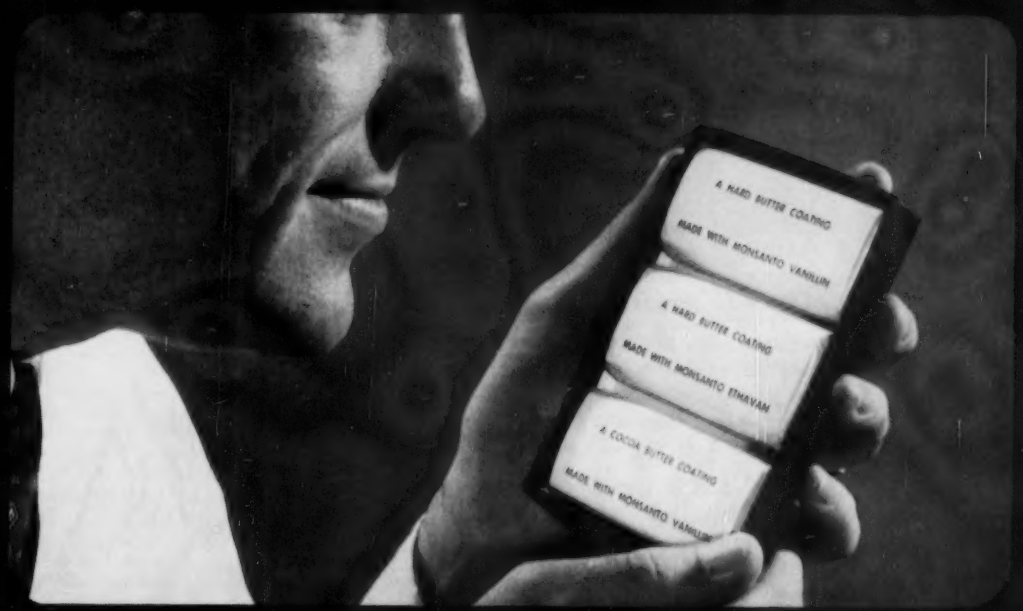
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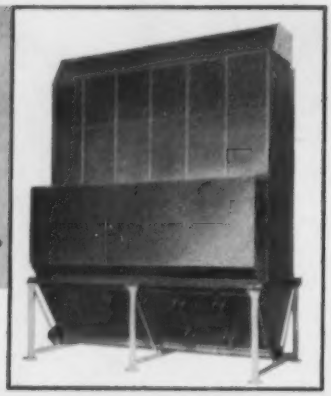

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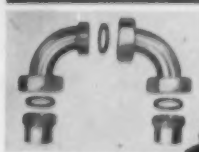

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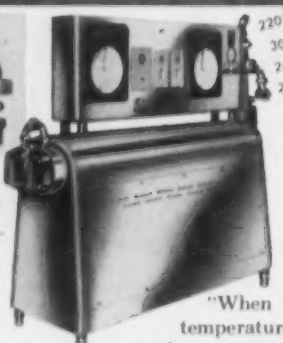

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p. 5678; proposed tolerance for malathion, July 21 *F.R.*, p. 5238; for sulphenone, July 27 *F.R.*, p. 5354; for chlordane, Aug. 5 *F.R.*, p. 5663.

Apples, dried, proposed further revision of AMS Grade Standards, July 29 *F.R.*, p. 5434.

Poultry, poultry products, miscellaneous amendments to AMS Grade Standards, July 29 *F.R.*, p. 5413.

Cheese, monterey, proposed amendment of FDA Standard of Identity, July 29 *F.R.*, p. 5436.

Pears, summer and fall, amended AMS Grade Standards, Aug. 5 *F.R.*, p. 5620.

Orange juice, concentrated, frozen, proposed amended AMS Grade Standards, Aug. 10 *F.R.*, p. 5780.

Tangerines, Florida, amended AMS Grade Standards, Aug. 12 *F.R.*, p. 5845.

Briefly . . .

● FOOD SCIENCE'S STRENGTH is reflected in the lusty growth of Phi Tau Sigma, the new honorary society. More then half our states and ten foreign countries are represented in the charter membership, which numbers 150.

● MANFACTURING CHEMISTS ASSN's new president is Gen. John E. Hull, former U. S. and U. N. commander-in-chief in the Far East.

● A-BOMBED FOODS from the recent Nevada tests have recently been on display at state and county fairs in Pennsylvania and Ohio. The exhibits, which will go on to other areas, are under the direction of the Federal Civil Defense Administration. Included are pertinent photos, captions, and explanations.

● FOLDING-BOX CONTESTS seeking new imaginative design ideas are announced by Pollock Paper Co., Dallas. Initial competition is being run in eight selected southwestern universities.

● APPLE-SORTING TABLE of USDA —the "float-roll" unit (FE July '54, p 149) —is now projected for coverage by a "public use" patent. Reported to have exceptional performance and to be suitable for other fruits and also vegetables, the equipment is already available from Dodge Yakima Supply Co., Yakima, Wash.

● REFRIGERATED WAREHOUSES recently honored for going one full year without a single lost-time industrial accident are: Crystal Ice & Cold Storage Co., Sacramento, Calif.; Merchants Refrigerating Co., Hopkins, Minn.; and Merchants Refrigerating Co., Newark, N. J.

● JAPANESE TUNA INTERESTS have revived their "Council on Tuna Exports" in order to present a united front as demands rise in the U. S. for higher tariffs against the Nipponese product.

Schedule of Events

September

6–16—Production Engineering Show; Navy Pier, Chicago.
12–16—Instrument Society of America, annual instrument-automation conference & exhibit; Shrine Exposition Hall & Auditorium, Los Angeles.
20–22—Industrial Packaging & Materials Handling Show; Kingsbridge Armory, New York City.
21–23—National Assn. of Dairy Equipment Mfrs., fall meeting; The Northernaire, Three Lakes, Wis.
25–28—Master Brewers of America, annual convention; St. Francis Hotel, San Francisco.
26–28—American Management Assn., personnel conferences; Hotel Statler, New York City.
26–30—Atomic Industries Forum, trade fair; Sheraton-Park Hotel, Wash., D. C.
29–O1—National Assn. of Bakery Sanitarians, annual meeting; Hotel Senator, Atlantic City.

October

1– 6—Bakery Equipment Mfrs. Assn., annual meeting, and American Bakers Assn.; Convention Hall, Atlantic City.
1– 9—International Food Fair, sponsored by Foreign Agricultural Service, USDA; Cologne, Germany.
3– 6—International Assn. of Milk & Food Sanitarians, annual meeting; Hotel Bon Air, Augusta, Ga.
6– 7—American Butter Institute, annual meeting; La Salle Hotel, Chicago.
6– 8—National Bakery Suppliers Assn., annual convention; Shelburne Hotel, Atlantic City.
8–15—International Dairy Show, annual; International Amphitheater, Chicago.
9–11—Produce Packaging Assn., annual conference & exposition; Conrad Hilton Hotel, Chicago.
10–12—American Oil Chemists' Society, fall meeting, Bellevue-Stratford Hotel, Philadelphia.
10–13—National Coffee Assn., annual convention; Mark Hopkins Hotel, San Francisco.
16–18—Brewers' Assn. of America, annual convention & exhibit; Edgewater Beach Hotel, Chicago.
17–21—National Safety Congress & Exposition; La Salle Hotel, Chicago.
23–28—International Assn. of Ice Cream Manufacturers, annual convention (24-26); Milk Industry Foundation annual convention (26-28); Dairy Industries Supply Assn. (23-28); Kiel Auditorium, St. Louis.

Processors Team Up

—*Continued from page 93*

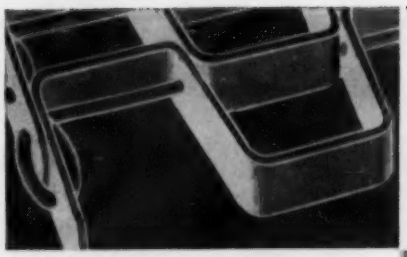
and separate production plant. The mix department occupies the west third of the space, the ice cream department the east third, and fluid milk and its associated operations the remainder.

This arrangement provides—

1. Availability of fresh milk from the fluid department for condensing and subsequent use in ice cream mix.

2. Interrelationship of plant personnel, making it possible to switch workers from one operation to another as required.

Use of two-way reversible floor con-



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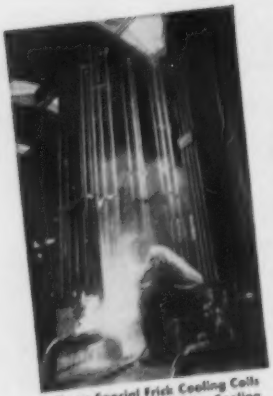

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veyors expedites movement of cans from the 15-truck loading dock on the west side of the building to the receiving room, the mix department, the mix cooler, and out to the south dock. Three sections of this conveyor can be reversed, making it possible to load at either the west or south docks.

With the exception of a new 30-ton Niagara blast freezer in the hardening room, new stainless evaporators, and packaging equipment, the units employed by the individual departments are those that already were on hand at the time of the merger.

In the fluid milk section, packaging facilities include two Pure-Pak fillers (one for half gallons, the other for quarts) and a Canco unit (for half pints), plus glass filling equipment originally owned by Dairy-Lea. A 30x30 ft. "expansible" cooler provides storage for this department.

The twelve supply departments that flank the four sides of the processing area are provided with exterior docks and entrances. They have tight-ceiling doors leading to this area. On the south side, serving the ice cream department, are two low-temperature rooms—an 18x54-ft., —40 F. hardening room, and a 40x54-ft. mix storage room.

In the southwest corner are the egg storage and candling rooms, and on the west side the milk receiving and storage room, and the bottle storage and washing room.

On the north side are the previously mentioned milk cooler, compressor room, and boiler room equipped with a 250-hp. gas-oil-fired boiler.

Finally, the east side accommodates the paper and packaging equipment room, quality control laboratory, and employees' locker rooms.

End (*Resume reading on page 94*)

Controlling Package Fill

—*Continued from page 64*

scales, according to Mr. Hall, and the inherent accuracy also is often greater.

The equipment detects height of fill variations within plus-or-minus $\frac{1}{64}$ in. This is equal to plus-or-minus 0.4% for the 14½-oz. cans of evaporated milk. But because inherent accuracy is a goal not often attained, the device as usually installed has an accuracy of plus-or-minus $\frac{1}{32}$ in., according to Mr. Hall.

Here are some of the things that affect accuracy: The conveyor carrying the container past the detection head, degree of foam, construction and composition of the container, and physical characteristics of the product.

With the detecting head in a fixed position, anything causing vertical movement of the container will result in apparent differences in fill level. So the conveyor should ride as smoothly as possible on its ways, and the ways themselves must be absolutely level. One of the most satisfactory conveyors for this purpose is the nylon table-top chain. With special nylon ways, it is virtually vibration-free. The conveyor should run continuously to avoid jerks which disturb product level.

Foam also is a contributing cause of inaccuracy, but can be minimized by identical treatment of each container between filling and detection.

Cylindrical tin cans are, by far, the most adaptable to weight determinations by measuring height of fill, said Mr. Hall. For homogenous liquids and free flowing powders, determination by height of fill is usually more accurate than gross weighing, regardless of speed. While the empty weight of smaller cans varies as much as 10%, variations in volume are never more than a fraction of 1%.

General Mills Uses Jet Weigher

Dollars and cents importance of good, accurate performance in net and gross weight filling was cited by William P. Schommer, Cereal Manufacturing & Packaged Foods Superintendent, General Mills, Inc., Minneapolis.

A packaging line averaging 50 packages per min. 24 hr. a day, five days a week, for 52 weeks would produce 18,720,000 packages, Mr. Schommer calculated.

If each package were ⅛ oz. overweight, 73,125 lb. of product would be given away during the year. At 20¢ a pound, this is a loss of $14,625. In large operations, the loss could easily get up to $225,000 or more a year.

Discussing net weighers, Mr. Schommer listed several items that affect accuracy. One is speed. If the machine is made to operate too fast, the scale starts to descend, or teeter, just as soon as it is unlocked, and inaccuracy results.

Another is product density. After the scale beam balances, the product continues to flow until a trip mechanism closes the shutters, and ¼ to ½ sec. elapses from balance to stream cut-off. Variation in product density will have a tendency to vary the product flow, or "measured increment," in this time interval.

Any change in the supply head may change rate of flow. So also will variation in impact caused by irregularities or voids in the product stream.

The air-jet principle used in the Pneumatron weigher makes that scale extremely responsive to changes in rate

E-Z Flow CONVEYING ELEVATORS

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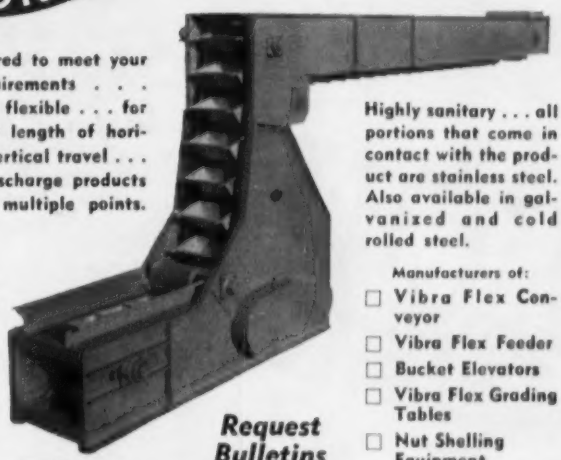

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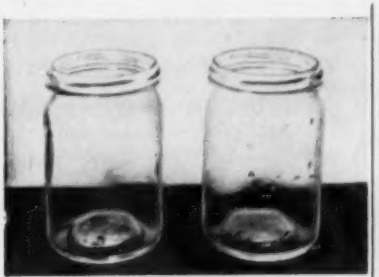

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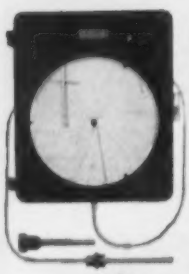

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of stream flow, resulting in much greater accuracy, according to Mr. Schommer. And no delicate trip mechanisms are involved, since air power permits use of a direct shutter latch. This approach reduces, and in some cases eliminates, the "measured increment," a vital factor in good weighing.

In a test run on the Wheaties 12-oz. package, the air-jet weigher was 90% accurate within plus-or-minus ½ oz., and it showed no drift. The conventional weigher gave an accuracy of plus-or-minus ½ oz. and drifted about ¼ oz. either way.

In packaging with gross weight weighers, variation in product density, speed, and tare weight of cartons cause errors. As much as ½ oz. variation in cartons has been found.

By using statistical control methods, long-term variations can be discovered and corrected to obtain steady accuracy, Mr. Schommer pointed out. To minimize effect of carton variation, a quantity of cartons should be weighed at intervals, the average tare weight determined, and the scales set accordingly.

Six basic points should be observed in packaging, according to Mr. Schommer:

1. Be sure to have the proper type of equipment for the product you are packaging.
2. Work closely with your machinery manufacturer in determining type and design of feed hoppers, bins, conveyors, etc. These are vitally important items in any filling operation.
3. Set up and maintain a good sanitation and maintenance program.
4. Train your operators thoroughly so they understand the equipment and how it functions.
5. Use statistical quality control techniques for sampling and control.
6. Don't be speed happy. Each type of weigher has its limitations.

How problems of accurately filling single-service packages were licked at Thomas J. Lipton, Inc., Hoboken, N. J., was reported by B. F. MacMahon.

He noted that overfill of 1g. per package of noodles would amount to $40,000 a year.

But Lipton achieved better than 99% of packages within a plus-or-minus 1g. range on a total package weight of 58g.

Lipton Engineers Accuracy

It took a lot of engineering to do this. And here are some of the things that contribute:

To make noodles feed properly, a triangular hopper was adopted, 20 in. high, with 6-in. sides at top. This hopper reduced to a 1-in. circular tube, and a motor driven rod stabbed up and down at the entrance of the tube. This broke the product bridge and the noodles passed down and attained almost stable density. A knife to cut off noodles projecting from filler cup was installed. Then an air jet was used to speed the noodles into the flexible bags.

Paste was extruded from a specially designed hopper by an auger and cut off to desired length.

Bridging of onions was overcome by using a hopper with two flat sides and a third side in the form of an arc, reducing to a 3-in. diameter, and equipped with a plunger.

Still the onions wouldn't go into a round measuring cup, so a cup with two flat sides and one arc-shaped side was made.

Cocoa is handled successfully by a pin auger with a spinner at the base.

To determine what tube diameter is best for handling a particular product, Mr. MacMahon recommended experiments with lucite tubes. Behavior of the product as it flows through the tube can be watched, and the most suitable tube diameter selected.

End (*Resume reading on page 65*)

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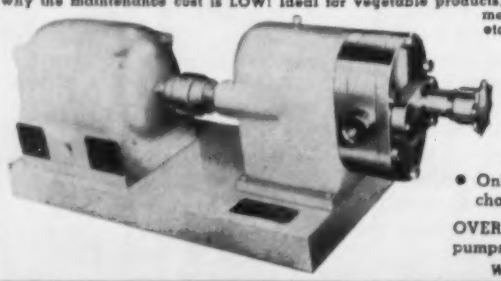

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Recent Inventions

PRODUCTS

Self-Icing Cake Batter Having Candy Particles Fusible at Baking Temperature—J. S. Andrews, St. Paul, and T. R. Freer, Minneapolis, to General Mills. No. 2,710,809. June 14, 1955.

Insecticide for DDT-Resistant Flies Comprising Mixture of DDT, Di (4 Chlorophenyl) Ethinyl Carbinol—M. M. Darley, Little Neck, N. Y. to Allied Chemical & Dye Corp., New York City. No. 2,711,384. June 21, 1955.

Cream-Custard Products Stabilized With Microorganism Growth Inhibitor—A. G. Castellani, to American Institute of Baking, Chicago. No. 2,711,976. June 28, 1955.

Terpeneless Essential Oils by Adsorbing Crude Oil on Solid Adsorbent, Eluting Successively With Terpenophilic, Oxygenated Organic Solvents, Recovering Terpeneless Oil From Latter—J. G. Kirchner, La Canada, and J. M. Miller, S. Pasadena, Calif., to USA. No. 2,712,008. June 28, 1955.

Coated Cereals by Tumbling Enriched Granules With Water-Insoluble Coating Solution, Dusting With Powder-Whitening Agent, Repeating Applications, Removing Solvents—R. La Pierre, Iselin, to Merck & Co., Rahway, N. J. No. 2,712,499. July 5, 1955.

PROCESSES

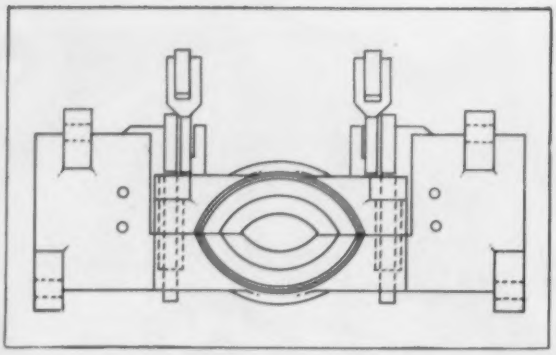
Separating Lactose From Skim Milk by Concentrating to 35-55% Solids, Adding Water-Miscible Solvent, Cooling, Crystallizing, Heating, Recrystallizing—D. D. Peebles, Hillsborough, and P. D. Clarey, Jr., Petaluma, Calif., to Western Condensing Co., San Francisco. No. 2,710,808. June 14, 1955.

Retaining Red Color in Meat by Comminuting, Forming Into Thin Layers, Holding in 50% Oxygen Atmosphere 18 Hr.—H. M. Coleman, Chicago, and E. W. Hopkins, Hinsdale, to Armour & Co., Chicago. No. 2,711,373. June 21, 1955.

Preventing "Gushing" in Beer by Adding Sodium Salt of Ethylenediamine Tetra-Acetic Acid to Bind Heavy-Metal Ions—P. P. Gray, Forest Hills to Wallerstein Co., New York City. No. 2,711,963. June 28, 1955.

Processing Coffee by Heating Beans With 100-350 Lb. Steam for 2-15 Min., Grinding, Extracting With Water, Adjusting pH—J. F. Hale, Syracuse, N. Y., R. B. Nottingham, Richmond, Va., and E. W. Pitz, Jr., Westfield, N. J., to Borden Co., New York City. No. 2,712,501. July 5, 1955.

Pasteurizing Milk by Evaporating, Mixing With Heated Water, Cooling Rapidly by Adding Sterile Cold Water—W. H. Coulter, Chicago, No. 2,712,504. July 5, 1955.



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Improved pocket design for vegetable orienting and trimming machine increases loading and cutting efficiency. Loading is eased and sped by use of springs, positioned between and engaging fixed and movable parts of links, which hold pockets continuously open. Vegetable is held firmly for trimming by clamping levers mounted on each side of stationary half of pocket.—E. W. Bridge, Philadelphia. No. 2,712,334. July 5, 1955.

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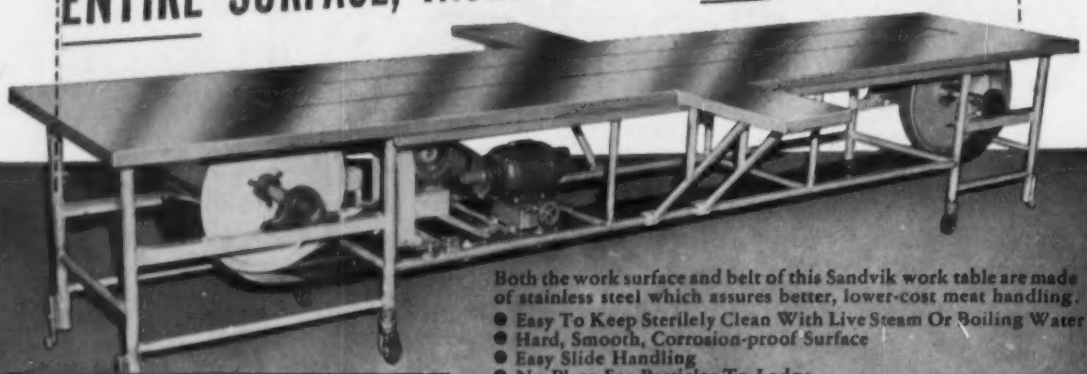

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Purifying Vitamin A Palmitate by Dissolving in Organic Solvent, Contacting Anion Exchange Resin on Hydroxyl Cycle, Separating Resin Adsorbate—R. H. Beutel, Newark, to Merck & Co., Rahway, N. J. No. 2,712,515. July 5, 1955.

Treating Steep Liquors by Incubating to Form Lactic Acid, Adding Sulphuric Acid to pH 2.0, Extracting Lactic Acid With Butanol, Adjusting pH to 5.5-7.5, Autoclaving, Separating, Drying—E. R. Kooi and E. C. Snyder, Berwyn, Ill., to Corn Products Refining Co., New York City. No. 2,712,516. July 5, 1955.

Recovering Unhydrolyzed Protein From Soy Beans by Extracting Oil-Free Material With Alkali at 70-120 F., pH to 10.5, Separating, Reducing pH to Precepitate Protein, Washing, Adding Minor Proportion of Fatty Acid—C. T. Nugent, J. W. Kaucher, and N. R. Gotthoffer, Cincinnati, to Buckeye Cotton Oil Co., Memphis, Tenn. Nos. 2,712,539-540. July 5, 1955.

Extracting Aconitic Acid and Plant Pigments From Sugar Cane, Sorgo Juices, or Molasses by Diluting Juice to 10-20 Brix, Screening, Treating in Ion Exchanger—T. A. Ventre, Baton Rouge, La., E. V. Bartmess, Washington, D. C., and E. K. Ventre, Jr., New Orleans, to USA. No. 2,712,552. July 5, 1955.

EQUIPMENT

Bearingless Roller Conveyor Having Spaced-Apart Endless Tracks, Working and Idler Rollers, Friction-Belt Driving Means—W. W. Cushman, Webb City, Mo. and J. L. Wentz, Passaic, N. J. to USA. No. 2,708,023. May 10, 1955.

Motorized Can Opener Comprising Wheel Cutting Knife, Eccentric Shaft, Crank Handle, Spur Wheel, Motor—G. J. Ripperger, Des Moines, Iowa. No. 2,710,444. June 14, 1955.

Vacuum-Drying Tray Consisting of Steam-Jacketed Bottom, Sump, Supports, Steam-Supply Branch Pipe, Spout—A. L. Andersen, Taastrup, Denmark. No. 2,710,456. June 14, 1955.

Poison Bait Station With Upstanding Wall Having Spaced Vats, Rodent Openings, Removable Cover—C. W. Starr, Caldwell, Idaho. No. 2,710,485. June 14, 1955.

Machine for Breaking Dried Alimentary Paste Strands, Comprising Horizontal Table, Conveyor, Laterally Extending Blade, Vertically Reciprocating Punch, Actuating Means—A. Fava, Milan, Italy. No. 2,710,583. June 14, 1955.

Sprayer for Dry-Coating Ice Cream Bars Having Rotor, Peripheral Buckets, Means for Aligning Products, Supplying Coating Particles, and Flipping Buckets—P. W. Parry, and J. G. Monteith, Vancouver, B. C., Canada. No. 2,710,588. June 14, 1955.

Cherry Pitter With Rotary Turret, Cup Feed Means, Prong, Closure Members, Alignment Means—W. W. Kelly, Portland, Ore., to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,710,636. June 14, 1955.

Bun Slicer Consisting of Traveling and Presser Conveyors, Splitting Disk, Drive Shaft—L. A. Fish, Phillipsburg, N. J. No. 2,710,637. June 14, 1955.

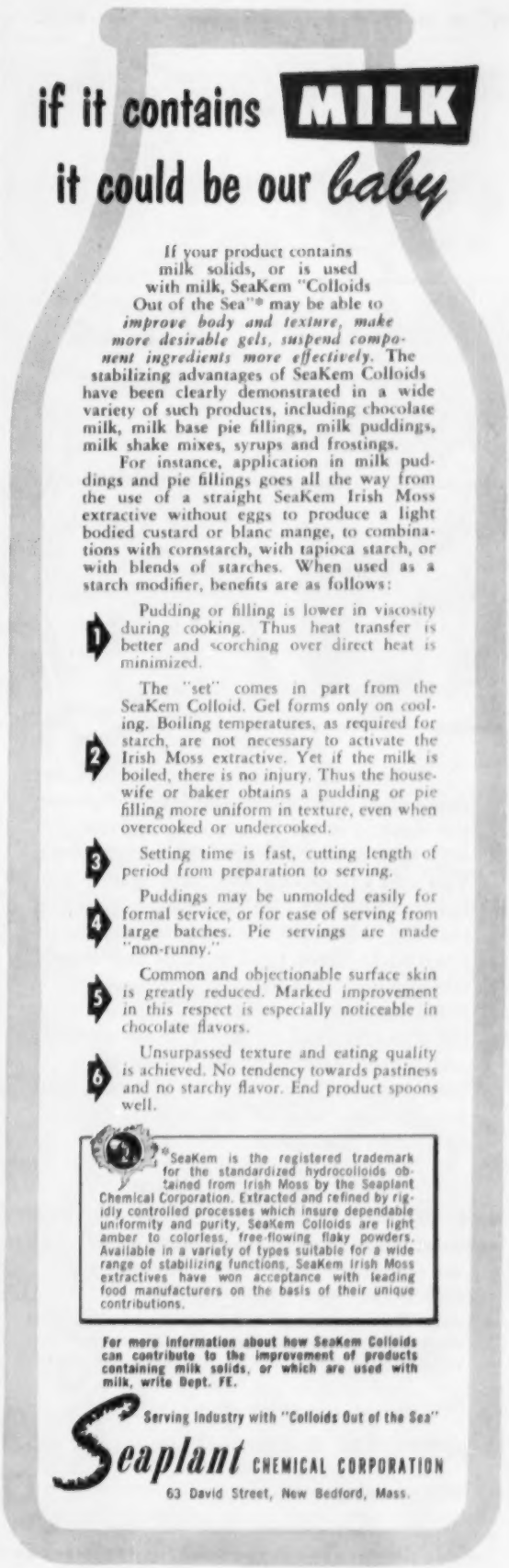
Egg-Handling Device Comprising Conveyor, Feeder, Guide Rail, Circular Bed Synchronized With Elevator—A. L. Cole E. Jaffrey, N. H. No. 2,710,682. June 14, 1955.

Centrifuge Having Vertical Drive Cylinder, Inverted Cone-Shaped Bowl, Feed Means, Annular Top Flange Defining Central Opening, Separate Passages, Outlets—E. Denman, Citrus Heights, Calif. No. 2,710,718. June 14, 1955.

Hand Truck and Lift With Frame, Hinged Member Having Converging Arms, Pivoted Supporting Shoe, Bracing Link, Connecting Means, Automatic Latch—E. A. Bayer, Sioux Falls, and L. D. Langdon, Centerville, S. D. No. 2,710,759. June 14, 1955.

Want more information on any of these recent patents — If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Poultry Scalder Consisting of Trough-Like Member Having Inlet, Outlet Ends, Botton Inclined Ramp, Water Delivery and Discharge Means, Conveyor—R. S. Zebarth, Hickman Mills to Gordon Johnson Co., Kansas City, Mo. No. 2,710,985. June 21, 1955.


if it contains MILK
it could be our baby
If your product contains milk solids, or is used with milk, SeaKem "Colloids Out of the Sea"® may be able to *improve body and texture, make more desirable gels, suspend component ingredients more effectively.* The stabilizing advantages of SeaKem Colloids have been clearly demonstrated in a wide variety of such products, including chocolate milk, milk base pie fillings, milk puddings, milk shake mixes, syrups and frostings.
For instance, application in milk puddings and pie fillings goes all the way from the use of a straight SeaKem Irish Moss extractive without eggs to produce a light bodied custard or blanc mange, to combinations with cornstarch, with tapioca starch, or with blends of starches. When used as a starch modifier, benefits are as follows:
1 Pudding or filling is lower in viscosity during cooking. Thus heat transfer is better and scorching over direct heat is minimized.
2 The "set" comes in part from the SeaKem Colloid. Gel forms only on cooling. Boiling temperatures, as required for starch, are not necessary to activate the Irish Moss extractive. Yet if the milk is boiled, there is no injury. Thus the housewife or baker obtains a pudding or pie filling more uniform in texture, even when overcooked or undercooked.
3 Setting time is fast, cutting length of period from preparation to serving.
4 Puddings may be unmolded easily for formal service, or for ease of serving from large batches. Pie servings are made "non-runny."
5 Common and objectionable surface skin is greatly reduced. Marked improvement in this respect is especially noticeable in chocolate flavors.
6 Unsurpassed texture and eating quality is achieved. No tendency towards pastiness and no starchy flavor. End product spoons well.
®SeaKem is the registered trademark for the standardized hydrocolloids obtained from Irish Moss by the Seaplant Chemical Corporation. Extracted and refined by rigidly controlled processes which insure dependable uniformity and purity, SeaKem Colloids are light amber to colorless, free-flowing flaky powders. Available in a variety of types suitable for a wide range of stabilizing functions, SeaKem Irish Moss extractives have won acceptance with leading food manufacturers on the basis of their unique contributions.
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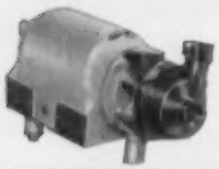

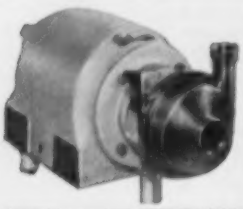

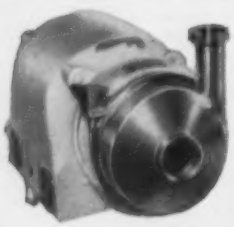

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Cheese Cutter Comprising Block Support, Blade, Backing Member, Resilient and Interengaging Means—W. E. Hastings, to Kraft Foods Co., Chicago. No. 2,711,020. June 21, 1955.

Canned-Food Sterilizer With Superposed Chambers Having Vertical Partitions, Inlet and Discharge Openings, Continuous Conveyor, Heater, Fans—E. A. Ekelund, Enebyberg, to Kooperativa Forbundet, Forening, u.p.a., Stockholm, Sweden. No. 2,711,129. June 21, 1955.

Reagent Feeder Having Shallow Tray, Side Walls, Outflow Lips, Baffles, Tilting Means—H. F. Kempton, Aurora, Colo. No. 2,711,190. June 21, 1955.

Weight Unit for Fork Lift Trucks Comprising Counterbalancing Means, Longitudinal Power Cylinder, Cable System—W. L. Shimmon, Modesto, Calif. No. 2,711,277. June 21, 1955.

Hand Truck Consisting of Frame, Upright Guide Members, Flanges, Channels, Control Carriage, Wheels, Brake Means—F. S. Butler, Memphis, Tenn. No. 2,711,261. June 21, 1955.

Meat Cutter Employing Rotary Bowl With Annular Receiving Trough, Circular Unloading Disk, Actuating Means—T. Gulbrandsen, Beverly, Mass., to John E. Smith's Sons Co., Buffalo, N. Y. No. 2,711,270. June 21, 1955.

Plastic-Food Slicer With Reciprocating Head Comprising Base Plate, Arcuate Blades, Wires, Product Holding Means—R. G. Bush and G. H. Hannon, to L. D. Schreiber & Co., Green Bay, Wis. No. 2,711,585. June 28, 1955.

Shrimp Peeler, Cleaner Having Frame, Tiers of End-to-End Spaced Rollers Adapted for Rotary and Reciprocating Motion, High-Speed Roller for Separating Loosened Hulls and Heads, Receiving Bucket—R. J. Samanie, Houma, La. No. 2,712,152. July 5, 1955.

Dough-Extruder and Cut-Off Mechanism for Pretzel-Twisting Machine—E. I. Groff, West Reading, to Quinlan Pretzel Co., Reading, Pa. No. 2,712,291. July 5, 1955.

Fish Boner Consisting of Feed and Cutting Members Mounted on Frame, Rotary Corer, Backbone Extractor, Drive Means—R. M. Berglund to Pacific Laboratories, Bellingham, Wash. No. 2,712,153. July 5, 1955.

Deep Fryer Comprising Cooking Vessel, Enclosed Combustion Chamber Having Oval Tubes With Internal Radiating Fins, Burner, Central Air Duct, Stack—R. T. Keating, Chicago. No. 2,712,308. July 5, 1955.

PACKAGING

Ice Cream Filler Consisting of Supply Pump, Movable Distributor Having Flexible Conduits, Nozzles—G. G. Alexander, Savannah, Tenn. No. 2,708,055. May 10, 1955.

Carton Packager Comprising Table Top With Drop-Door Sections, Combined Guide and Support, Vertically Slidable Compartmented Carrier, Plungers, Actuating Means—G. H. Cox and T. T. Smith, to P. F. Nockels and E. L. Miller, Yuma, Ariz. No. 2,709,029. May 24, 1955.

Liquid Filler Consisting of Measuring Chamber, Outlet Passage, Check Valve, Slideable Cylindrical Plug, Sealing Means—B. S. Harrington to Armour & Co., Chicago. No. 2,709,538. May 31, 1955.

Potato Bagger Comprising Flared Hopper, Transverse Partition, Discharge Runway, Conveyor, Drive Means—K. G. Brown, Mattituck, N. Y. No. 2,710,125. June 7, 1955.

Beverage Carton With Divisible Compartments Formed From Scored Integral Blank—L. P. Grecco, Portland, Ore. No. 2,710,130. June 7, 1955.

Bottle Carrier Having Engageable Ridge, Aligned Fold Lines, Rotatable Lip—P. Zalkind, New York City, to A. M. and M. Zalkind. No. 2,710,219. June 7, 1955.

Carton Former Employing Suction Head Mounted to Swing About Main, Secondary Pivots—H. Ahlmeyer, Orangeburg, and W. D. Sherman, W. Nyack, N. Y. to Robert Gair Co., New York City. No. 2,710,566. June 14, 1955.

Cooling Package Seals by Contact With Refrigerated Stationary Wall of Polytetrafluoroethylene Resin—M. A. Stickelber, Kansas City, Mo., to Stick-

elber & Sons, Inc. No. 2,710,641. June 14, 1955.

Container With Combined Can Opener and Handle Comprising Grip Unit, Puncturing Device, Rim-Engaging Hook—A. P. Krivanek, Milwaukee. No. 2,711,016. June 21, 1955.

Single-Walled Metal Barrel, Welded of Two Unitary Halves, Having Chime and Rolling Ring, Bung, Groove Inserts—E. H. Benson, Kansas City, Mo. No. 2,711,264. June 21, 1955.

Filler for Half-Round Fruit Comprising Trap Door With Coplaner Slideable Plates, Feed, Alignment and Can Positioning Means—H. W. Bartlett, Berkeley, Calif. to California Packing Corp., San Francisco. No. 2,711,275. June 21, 1955.

Diced-Meat Filler Employing Feed Table, Conveyor, Feeder With Scraping Face, Synchronizing Means—R. H. Simpson, to H. J. Heinz Co., Pittsburgh. No. 2,711,850. June 28, 1955.

Milk-Container Carrier Consisting of Rectangular Frame, Upwardly Projecting Center Partition, Aperture, Container-Supporting Flaps—S. I. Batkin, New Rochelle, N. Y. No. 2,711,922. June 28, 1955.

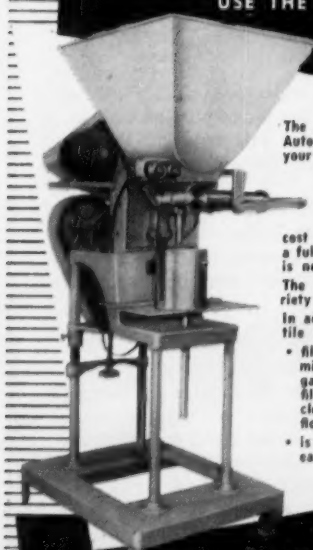
Bag Closer and Sealer Comprising Filled Cellophane-Bag Receiver, Closing Mechanism, Rollers, Adhesive Applicator—M. W. Sawyer and R. G. Kenway, Los Angeles, H. W. Wilson, Jr., Moscow, Idaho, and J. S. Overholser, Venice, Calif., to M. W. Sawyer and H. W. Wilson, Jr. No. 2,712,210, July 5, 1955.

Labeler Having Label Holder, Picker, Adhesive Applicator, Transfer Mechanism, Container Support, Presser Means—J. M. Brown, Lynwood, Calif. No. 2,712,393. July 5, 1955.

Protective Packaging for Frozen Foods Comprising Ice Glaze and Air-Tight Impervious Coating Applied by Quick-Freezing at —20 C., Applying Molten Polyethylene at 115 C.—J. C. C. Dyekjar, Esbjerg, Denmark. No. 2,712,503. July 5, 1955.

Beverage Package Comprising Spherical Container With Collapsible Walls, Gas Under Fressure, Sealed Outlet Tube—L. Peters, Evanston, Ill. No. 2,713,543. July 19, 1955.

SAVE EQUIPMENT and PRODUCTION COSTS
on your smaller filling jobs
USE THE MODEL B



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Simple New Test

—Continued from page 67

regarded as a highly respected tool. In fact, its benefits have been greatly increased through prior information gained from the tests.

Personnel Training

The second phase in Welch's program has involved special means for training the "material" thus selected.

This has been accomplished in a conference-type training system, starting at top management levels.

Twice-yearly there are meetings in Westfield of plant managers from across the country. These men gain executive knowledge through solving problems in finance, production, and personnel.

All managers are further trained in conference leadership so that they may efficiently conduct regular meetings on the plant level, attended by all the foremen. These gatherings serve to highlight latest company policies, expose local problems for solution, and provide a time for planning and scheduling plant production.

The company's *Personnel Policies & Procedures Manual* is another training aid, issued to each supervisor down to first-line foremen. Here, clear cut definition of administrative procedure and policy gives each member of management the information he needs to guide him in day-to-day relations with his employees.

A management development program manual is also provided each supervisor. It is divided into three sections:

The first contains releases, called *Management Muses*, containing pertinent abstracts of articles, book reviews, announcements of company progress, and any other material of interest and help to management; second, notes taken during the weekly conferences; and third, summaries of management training conferences—periodically conducted at the plants by central staff personnel—that consider such topics as cost control, employee training, and human relations.

There is a close tie-in between plant managers and the central personnel director. In this way, fast aid can be obtained to solve employee problems before they become serious.

Each plant has a personnel and production planning director to facilitate employment of hourly workers. Future plans call for instructing these men in test application.

Pays Off in Results

On-the-job participation in management goes a long way toward full employee satisfaction. At this company, joint participation committees, composed of management men and workers, boost company improvement through regular meetings. Here, cost-cutting ideas are developed, and new company policy and procedure is introduced to the workers.

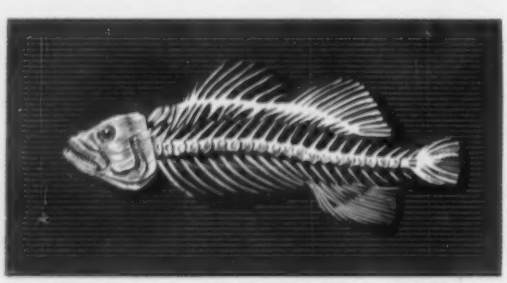
End (Resume reading on page 68)

Take-Home 6's

—Continued from page 89

cans travels under the carton magazine, dividing chains on each side of the machine separate the cans into groups of six (two rows of three's). Can grouping is accomplished by Teflon-coated plungers riding on the dividing roller chains. These plungers travel at the same speed as the cans as they push in and out of each 6-can

CASE OF THE
FISH AND BONE



Fundamentally, it was the sort of circumstance our engineers had become involved in many times before. But in our files it was recorded as the *241st different type of product* processed with Sutton equipment.

Specifically, the problem was to find a practical means of removing bones from dry fish fibres, the latter being a by-product in the production of high-quality shredded salt codfish. The importance of establishing an efficient solution was a matter of pure economics. With the bones removed the sale value of the by-product would automatically increase from one cent to thirty cents per pound.

From fourteen basic models, incorporating 64 different types and sizes, Sutton selected an Air-Float Stoner to do the job. The results were little short of spectacular.

Application of the famous sixty-seven year old SS&S Process — "the separation of dry agricultural and industrial materials by effecting differences in specific gravity through air-flotation" — revealed these facts during the first few months: *Total income from sale of "Suttonized" by-product — $18,798.72; operating cost of Air-Float Stoner — $142.44.*

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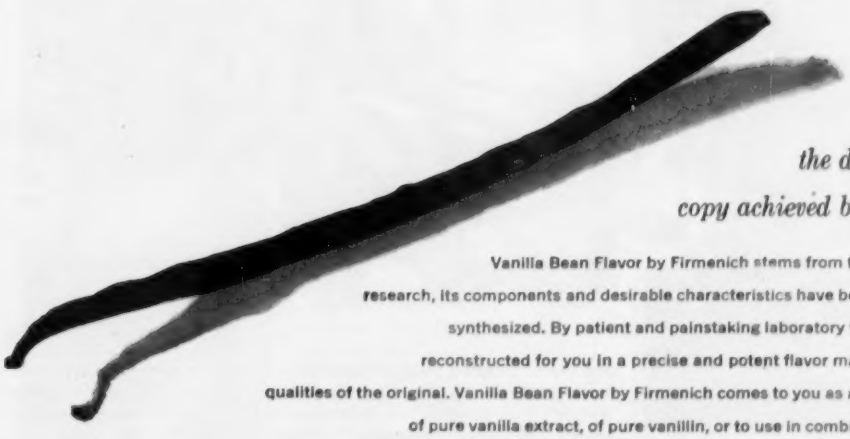

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Vanilla Bean Flavor by Firmenich stems from the vanilla bean. By original research, its components and desirable characteristics have been isolated, identified, and synthesized. By patient and painstaking laboratory techniques, they have been reconstructed for you in a precise and potent flavor material with all the aromatic qualities of the original. Vanilla Bean Flavor by Firmenich comes to you as an economical replacement of pure vanilla extract, of pure vanillin, or to use in combination, in the manufacture of all products that you flavor with this most popular of flavors.

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group during the separating stage of the operation.

Movement of the plungers in and out of each can group is accomplished by a pair of angle irons. Speed of can and carton feed conveyors is synchronized.

Grouped cans are now transferred to two rubberized fabric belts (each 2 in. wide) as they pass under the compression section. Here, a pair of rubberized fabric belts hold the carton in close contact with the top of each can group while it is formed around the cans and then discharged as a complete take-home package.

First cartoning-forming step is made as a group of cans travels past two stationary plows. Ends of the carton protruding over the cans strike the plows, making 90-deg. side folds along the can group.

Partially cartoned group is now carried on a folder sword. Carton flaps protruding below the cans strike a pair of rods that folds them up against the bottom of the sword. Carton-packed group then slides off the sword, ready for the next operation—tightening and locking of the carton.

At this stage, the carton travels on a cartoning chain, with triangular-shaped tightening lugs entering wedge-shaped holes on the bottom of the carton. Guide bars now force the lugs toward the center of the carton as it continues forward, tightening the carton around the cans.

As the tightening lugs hold the carton in perfect alignment, four double cam-actuated locking fingers strike the locks on the bottom of the carton to secure and complete the package. Locking is accomplished as one cam carries the fingers up and forward and the other down and back.

Cartons are finally discharged onto roller conveyors and then belts that feed them into a semi-automatic case-packer. Here, take-home cartons are packed eight to a shipping case.

Machine runs off a Reliance d.c. variable drive, driven by a 1½-hp., 150v. motor. Vacuum pump is operated by a ½-hp. a.c. motor. And intake conveyor is powered by a ¾-hp., gearhead d.c. motor.

This straight-through cartoning machine is pushbutton-operated from a panel mounted on the unit. By flipping a speed-control dial, output can be varied from 0 to 650 cans per minute. Another switch can be set to put the can line on automatic, single-cycle, or jog. Still another can be adjusted for manual or automatic starting of the machine after the can-supply microswitches have been actuated.

There is also a totalizer for counting cartons discharged from the machine. In addition, there are safety switches to prevent jam-ups on can line, carton feed, and compression belts.

End (*Resume reading on page 90*)

Soluble Solids Control

—*Continued from page 69*

it is stated that the instrument has paid for itself in three months on the basis of increased yield alone.

Another interesting application is one in which a single instrument controls Brix in a battery of ten open preserve kettles at Chester C. Fosgate Co., Orlando, Fla.

Refractometer is mounted in a fixture that runs along a track above the row of kettles. Product is ladled from kettle to fixture, checked for Brix, and allowed to run back to the kettle through a valve in the bottom of the fixture. Because of this instrument's windshield-wiper arrangement, there is no delay in taking readings.

In this operation, fixture temperature stabilizes at about 200 F., thus refractometer is calibrated for that temperature. In this way, each batch is controlled to within ¼% Brix.

End (*Resume reading on page 70*)

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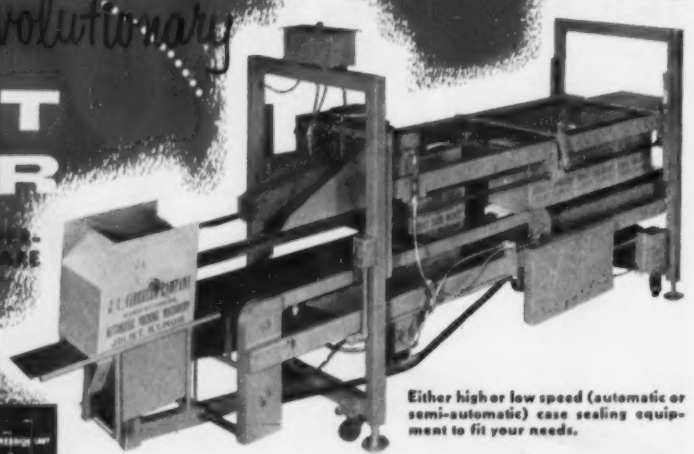
SHORT SEALER

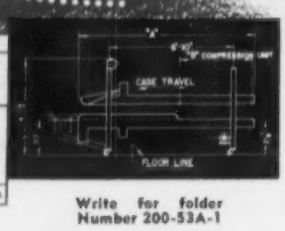
LOW COST, ECONOMICAL TO OPERATE, TAKES LESS THAN 30 SQUARE FEET OF FLOOR SPACE.



Either high or low speed (automatic or semi-automatic) case sealing equipment to fit your needs.

SPEED: MAXIMUM 30 CASES PER MINUTE		
B COMPRESSION UNITS	*LINEAL INCHES OF CASES PER MINUTE	A OVERALL LENGTH
4'-0"	96"	9'-9"
5'-0"	120" (BASED ON 30 SEC. COMP. TIME)	10'-9"
6'-0"	144"	11'-9"

*LINEAL INCHES OF CASE—LENGTH OF CASE X CASES PER MIN.



Write for folder Number 200-53A-1

The sealer pictured above adjusts from one size to another in a jiffy—*fast—easy—quickly*. The glue skip is also easily adjusted and trouble-free. It is built strong and sturdy, with welded rigid steel frame construction; heavy duty chains throughout, oversize bearings for long wear, and gear reduction unit. Powered by a ⅓ H.P. motor, and yet the whole sealer weighs only 1150 pounds.

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Industry

Arrow Spice & Food Co., Dallas is building a 25,000 sq. ft. building which will enable it to handle 1 million lbs. of dried beans daily.

Aquafoods Corp., Tampa, Fla., has been formed to coordinate marketing operations of seafood producers who merchandise products under **Carnation Co.** label.

Borden Food Products Co. is building a new warehouse at its evaporated milk plant in Chester, S. C.

Burris Mills, Inc. is again operating its **Galveston unit**, Texas Star Flour Mill, which has been closed for the past six years.

California Walnut Growers Assn. has started construction of a 550,000 sq. ft. packing plant in Stockton, Calif.

Campbell Soup Co. is constructing a new plant with total floor area of 20 acres in Napoleon, Ohio to include offices, lab, warehouses, and can making facilities.

Canada Dry Ginger Ale, Inc. has begun operations at its new Maspeth, L. I. plant.

Joseph Carr's Sons, meatpacking concern, Albany, is negotiating to acquire **Codling Packing Co.**

Consolidated Foods Corp. has completed negotiations to acquire **American Frigid Dough, Inc.**, Chicago.

P. Reid Oliver has been appointed vice-president of Foremost Dairies, Inc. He is a director of National Dairy Council and former president of American Dairies, Inc., now a subsidiary of Foremost.

John A. Robins, former vice-president of Stokely-Van Camp Co., Inc., has been elected president of Fairmont Food Co., Omaha, Neb., succeeding **D. K. Howe** who is now chairman of the board.

Davidson Baking Co., Portland, Ore., has completed improvements in its 120-ft. oven which now permits production of 1 million lb. per week.

Delmonico Foods, Inc., Louisville, has merged with **Antonio Palazzolo & Co.** of Cincinnati.

F. W. Fearman Co., Ltd. plans to build a $1 million meat packing plant on a 66-acre site near Nelson, Ontario.

Ferguson-Langfield Frozen Foods, Inc., Oakland, Calif., is constructing new office headquarters.

Frozen Food Operations, Inc. has filed a charter of incorporation with authorized capital stock of $25,000.

General Foods will construct a new food research center on a 55-acre site in Tarrytown, N. Y.

Hawaiian Pineapple Co., Ltd. and **S & W Fine Foods** have dropped consolidation discussions.

Hygrade Food Products Corp., Detroit, has acquired **Land O'Frost Co.** of Chicago.

Lealand Co. Ltd., of Tilbury Canada, has been purchased by **Hunt Foods Export Corp.** This is the first Hunt production facility in Canada.

Lee Foods, Inc. has been incorporated in Hazelton, Pa., for manufacture of food products.

Strahman AUTOMATIC WATER-SAVER SPRAY NOZZLE

Ideal for Dairy and Food Industries

The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water.

RENEWABLE RUBBER COVER. The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

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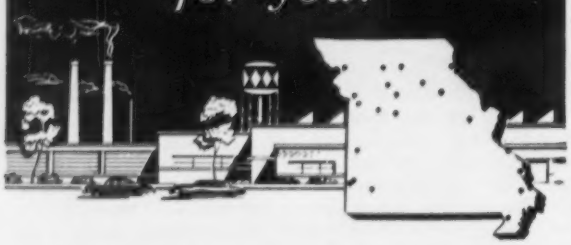
COMMUNITIES SAY:
"Let us 'tailor-make' a plant and more opportunity for you!"



Yes, you can write your own ticket in Missouri . . . your choice of industrial buildings listed in the latest "Missouri Quarterly Available Buildings Report"; your choice of twenty cities, large and small, which are ready and able to *tailor-make* your plant to your plans in "Organized Industrial Districts"; your choice of over 100 other communities willing to organize, acquire sites and build for you!

And Missouri doesn't send you . . . Missouri goes with you to the plants and the people in your own private exploration tour!

This personal, confidential service is the "extra ingredient" in Missouri's "Tailor-Made Industry Plan" which, exclusive of big national industry expansions, helped locate and build new plants totaling $136,000,000 in the "show me state" last year. And Missouri is rich in power, oil pipelines, gas, coal, industrial water, chemicals, minerals, forests, agriculture and recreation for good living and top production. Its unrivaled road, rail and water network make Missouri the crossroads of America.

But the biggest bonus Missouri offers is its different "Tailor-Made Industry Plan", which prepares the right community for the plant . . . then builds the plant to your plans! It will pay you to let Missouri show you first. For complete, confidential exploration,

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James D. Idol, Industrial Director
Missouri Division of
Resources & Development
Jefferson City, Missouri

Henry Cragg has been named to new post of administrative vice-president of Minute Maid—Snow Crop Frozen Foods, New York City.

Milady Food Products, N.Y.C., has purchased a 5,000 ft. building to increase plant facilities, and plans a 10,000 ft. addition to its kitchen.

Pacific States Canning Pear Marketing Assn. has been formed, with Jack Anderson, president of **Calif. Canning Pear Assn.**, as first president of the new group.

Snively Groves Corp., Winter Haven, Fla. has announced a $500,000 expansion program designed to double the size of its plant.

Sunkist Growers, products dept. will build a new office building in Ontario, Calif.

Vacu-dry Co., Oakland, Calif., has acquired **Gold Ridge Products, Inc.** of Sebastopol, Calif.

Western Canners Co. has acquired **West Coast Packing Co.,** Newport Beach, Cal.

Personnel

Dr. **Earl Auerbach** has been appointed assistant to director of research for Amer. Meat Inst. Foundation.

C. W. Cook has been named general manager of Maxwell House Div. of General Foods.

Dr. **Chester Dahle,** professor of dairy mfg. at Penn State Univ., has retired after 31 years of service, but will continue working in the ice cream consulting field.

Armand Erpf has been elected a director of Minute Maid Corp.

J. K. Evans, retired v.-p. of General Foods, will become consultant to the executive committee of Pan-Amer. Coffee Bureau Oct. 1.

C. Russell Feldmann is new director of C & C Super Corp.

Oliver W. Gaffney has been named general manager of Wilson & Co.'s Oklahoma City plant.

Curtis H. Gager, formerly with General Foods, has been elected vice-president for The Coca-Cola Co.

William Graf, Jr. has been appointed director of engineering for Arnold Bakers, Inc., Port Chester, N. Y.

Dr. C. L. Hankinson has been named v.-p., manager, and technical director of Tony Downs Foods Co., producer of Duncan Hines' frozen poultry products.

Nelson Hardy, former superintendent of Carnation Co.'s Maysville, Ky. plant, has been promoted to div. superintendent of firm's Canadian operations.

Thomas Harrison has been elected to the board of Green Giant Co., Le Sueur, Minn.

Dr. **Matthew E. Highlands,** food technologist for **Maine** Agri. Experiment Station at U. of Maine, has been named head of the Station's new department of food processing.

Joseph Janda has been elected secretary of Booth Fisheries Corp.

Dr. **Carl Krieger** has been named director of basic research for Campbell Soup Co. in Camden, N. J.

David Martin is new v.-p. and director of sales for Ocoma Foods Co., Omaha.

G. A. Morris has been named to the board of directors for Ogilvie Flour Mills Co., Ltd.

N. L. Schleifer has been promoted to asst. technical director for Falstaff Brewing Corp., headquarters in St. Louis.

E. B. Schmink has been named v.-p. of Borden's Dairy & Ice Cream Co., Columbus, Ohio.

Alfred Steele, president of Pepsi-Cola Co. since 1950, has been named chairman of the board and chief executive officer. **Herbert L. Barnet,** executive v.-p., will succeed him as president.

Jean Taylor, home economist, has been made consumer service director for Fairmont Foods Co., Omaha.

Harold Thrash has been named secretary-treasurer of Central Eureka Corp., San Jose, Calif.

Frank Vamos has been named manager of Kroger Co.'s northern div.

Associated Industries

Amer. Agile Corp., Cleveland, is planning a 10,000 sq. ft. addition for manufacturing and research.

Amer. Brake Shoe Co., N.Y.C. has promoted George Decker, Wm. Starbuck and Fred Cogswell to v.-p. posts.

Amer. Crucible Prod. Co. has acquired **Kenco, Inc.** of Lorain, Ohio.

Ball Bros. Co., Inc. has appointed Howard Ward controller.

Bostitch, Inc. has broken ground for a new factory-headquarters in E. Greenwich, R. I.

Continental Can Co. has acquired **Carl Leigh Assoc.,** Chicago fruit & vegetable packaging sales firm.

Crane Packing Co. has begun construction of two one-story buildings in Morton Grove, Ill., to be used for research and lab operations.

Hammond Bag & Paper Co., Wellsburg, W. Va., has been purchased by **Hudson Pulp & Paper Corp.,** N.Y.C.

Hoerner Boxes, Inc. has opened new manufacturing plants in Keokuk, Iowa and Minneapolis.

Hofman Industries, Inc., Sinking Spring, Pa. has purchased **The Nat'l Alfalfa Dehydrating & Milling Co.'s** interest in **Nat'l Chlorophyll & Chem. Co.,** Lamar, Colo.

Hyster Co. has named Anthony Pack to new post of assistant to the president.

Internat'l Paper Co. has appointed C. B. McCord plant manager of three multiwall bag plants.

Owens-Illinois has named Bradley Holbrook project engineer of its new glass container plant to be built in Portland, Ore.

William Shollenbarger, former treasurer, has been named vice-president in charge of finance for Real Gold Co., Calif. fruit juice processing firm.

Rodney Hunt Machine Co. has opened a N.Y.C. office to provide engineering and sales service for chemical and food process industries.

Richardson Scale Co. has opened new European headquarters in Geneva, Switzerland.

Rohm & Haas Co. has completed its new plastics research & development Lab in Bristol, Pa.

Sterling Electric Motors, Inc., Los Angeles, has appointed Edgar Johnston v.-p. of manufacturing and John Eastman chief engineer.

Package Machinery Co., E. Longmeadow, Mass., has named Louis Curtis vice-president in charge of sales.

Vulcan Steel Container Co. has completed installation of new steel pail production line, increasing production capacity of pails and drums by over 60%.

Deaths

Frederick C. Busche, 80, founder and former president of Grandma Baking Co., Oakland, Calif.—June 13.

Richard S. Reynolds, 73, founder and board chairman of Reynolds Metals Co., president and director of U. S. Foil Co., and member of 10 other boards of directors.—July 29.

William Schilling, Jr., 63, officer and secretary of Norda Essential Oil & Chem. Co., Inc., N.Y.C.—July 15.

NEW! Re-Designed

Babbitt
—Adjustable—
SPROCKET RIM
with Chain Guide

ANY VALVE is readily accessible *from the floor* with low-cost Babbitt Sprocket Rim. Now re-designed for—

- **Greater strength**
- **Easier, quicker, more solid assembly**

Simplifies pipe layouts, prevents accidents, fits all valve wheels. Your supplier carries complete stocks. Call him — or write for folder and prices.

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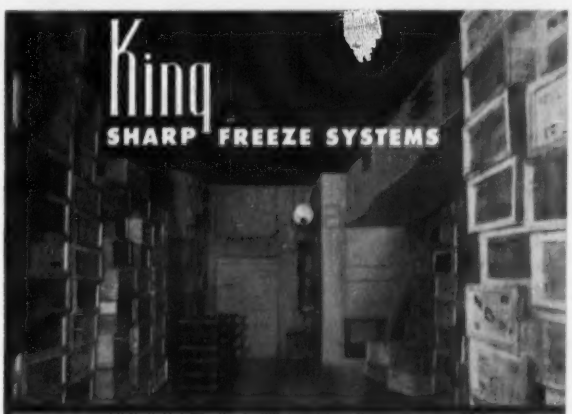
7 BABBITT SQUARE, NEW BEDFORD, MASSACHUSETTS, U.S.A.



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More than 400 plant operators here and abroad have chosen King Systems for more efficient bulk freezing jobs for bigger profits. King Systems give you increased cold-room capacity, faster freezing, engineered distribution of air, continuous operation with no costly defrosting shut-downs, retention of product flavor and quality, lower power costs, a quick-freeze system designed for your specific needs.

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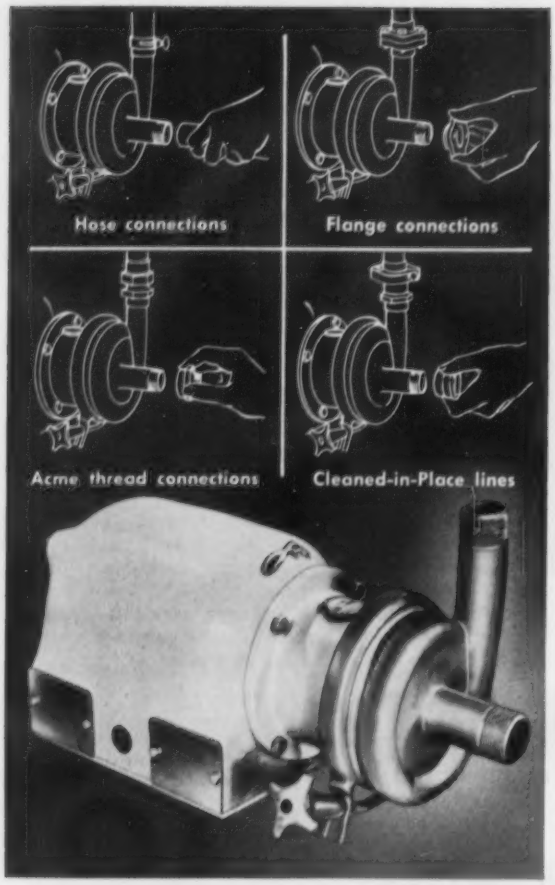

Standard with I.P.S. connections.

New CHERRY-BURRELL Vapor Blast Finish 316 Stainless Steel Pumps

As shown above, you can connect new Cherry-Burrell foamless "Flexflo" Centrifugals in any of 5 different ways. In addition, you position adjustable outlet to fit any pipeline setup.

Should you want to clean or inspect any of the corrosion-resistant Type 316 fortified stainless steel contact surfaces, you disassemble pump in 30 seconds—reassemble in 60—all without tools.

Other Flexflo Features

Low Operating Costs: Body design assures full flow discharge with low friction loss, reduced power.

Positive Sealing with less pressure, less wear.

Capacity Range: From 2000 lb./hr. to 100,000 lb./hr. and heads up to 120 ft.; ¾ to 10 h.p. motors.

Ask your Cherry-Burrell Representative for further Flexflo details. Or write for literature.

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PLANT ENGINEERING

Fume Scrubbers

Complete technical details on line of fume scrubbers and packaged scrubbing systems for removal of noxious materials from gas wastes. Bulletin 4-R, 12 p.—*Schutte & Koerting Co., Cornwells Heights, Pa. (220A)*

Expansion Joints

Characteristics and advantages presented for a line of grease-packed, steam line expansion joints, available in flange-type or weld-type construction. Price list included. 16 p.—*Yarnall-Waring Co., New York City. (220B)*

Aluminum Clad Metals

Technical paper answers questions on uses of aluminum-clad metals. Applications are discussed and properties of special products covered. Bulletin 30, 4 p.—*Reynolds Metals Co., Louisville, Ky. (220C)*

Refrigeration Compressors

Treats of selection and proper use of refrigeration compressors to gain maximum efficiency. Diagrams and photos illustrate components and applications.—*Freezing Equipment Sales, Inc., York, Pa. (220D)*

Variable Speed

Descriptions, ratings, dimensions, and other engineering data presented for line of ball-bearing-type variable speed units. Bulletin K-200, 8 p.—*Cleveland Worm & Gear Co., Cleveland. (220E)*

Compressor Line

Wide line of refrigeration compressors is pictured along with pertinent engineering and maintenance information. Tables give specifications. Bulletin 100-G, 14 p.—*Frick Co., Waynesboro, Pa. (220F)*

Electrical Service Units

Large catalog illustrates and details extensive line of circuit breaker load centers, fusible service equipment, safety switches, open knife-switches, circuit breakers, lighting panel boards, and bus- and wire-ways. Catalog GEC-1031, 94 p.—*General Electric Co., Plainville, Conn. (220G)*

Steam Generators

Concerns features of a series of steam generating units ranging in capacity from 50,000 to 150,000 lb. steam per hr. Working pressures available to 1,500 psi. Bulletin B-55-4, 4 p.—*Foster Wheeler Corp., New York City. (220H)*

Motor Controls

Depicts starters, switches, and other auxiliary equipment for motor control in air conditioning, heating, pumping, and compressing systems. Extensive charts list all specifications. Bulletin EC-80, 40 p.—*Cutler-Hammer, Inc., Milwaukee. (220I)*

Stainless Valves

Concerns applications and properties of a series of globe, gate, and check valves constructed of monel and stainless steel. Bulletin 9, 4 p.—*Alloy Steel Products Co., Linden, N. J. (220J)*

Solenoid Valves

Comprises information on construction, uses, and advantages in a line of plastic and stainless steel, sanitary solenoid valves. Catalog 101, 4 p.—*Valcor Engineering Corp., Kenilworth, N. J. (220K)*

Lubricating Unit

Outlines possibilities of a lubricating unit designed to automatically provide jetting, cycling, and continuous oiling service in machines requiring more than one method of lubrication service. Bulletin 55A, 2 p.—*Bijur Lubricating Corp., Rochelle Park, N. J. (220L)*

Deaerating Heater

Treats of compact, simple, deaerating feed water heater used with small steam generating plants. Bulletin WC-118, 4 p.—*Graver Water Conditioning Co., New York City. 220M)*

Technical Tables

Extensive booklet presents wide number of chemical, physical, and engineering tables of use to food industry men. Among data printed are conversion tables, properties of plastics, weights and measures, and specific gravity calculations. 114 p.—*U. S. Testing Co., Inc., Hoboken, N. J. (220N)*

Gate Valve Lines

Two bulletins specify lines of bronze and iron gate valves. Diagrams illustrate features. Tables give dimension data. Forms 1005 and 1006, 8 p.—*Ohio Injector Co., Wadsworth, Ohio. (220O)*

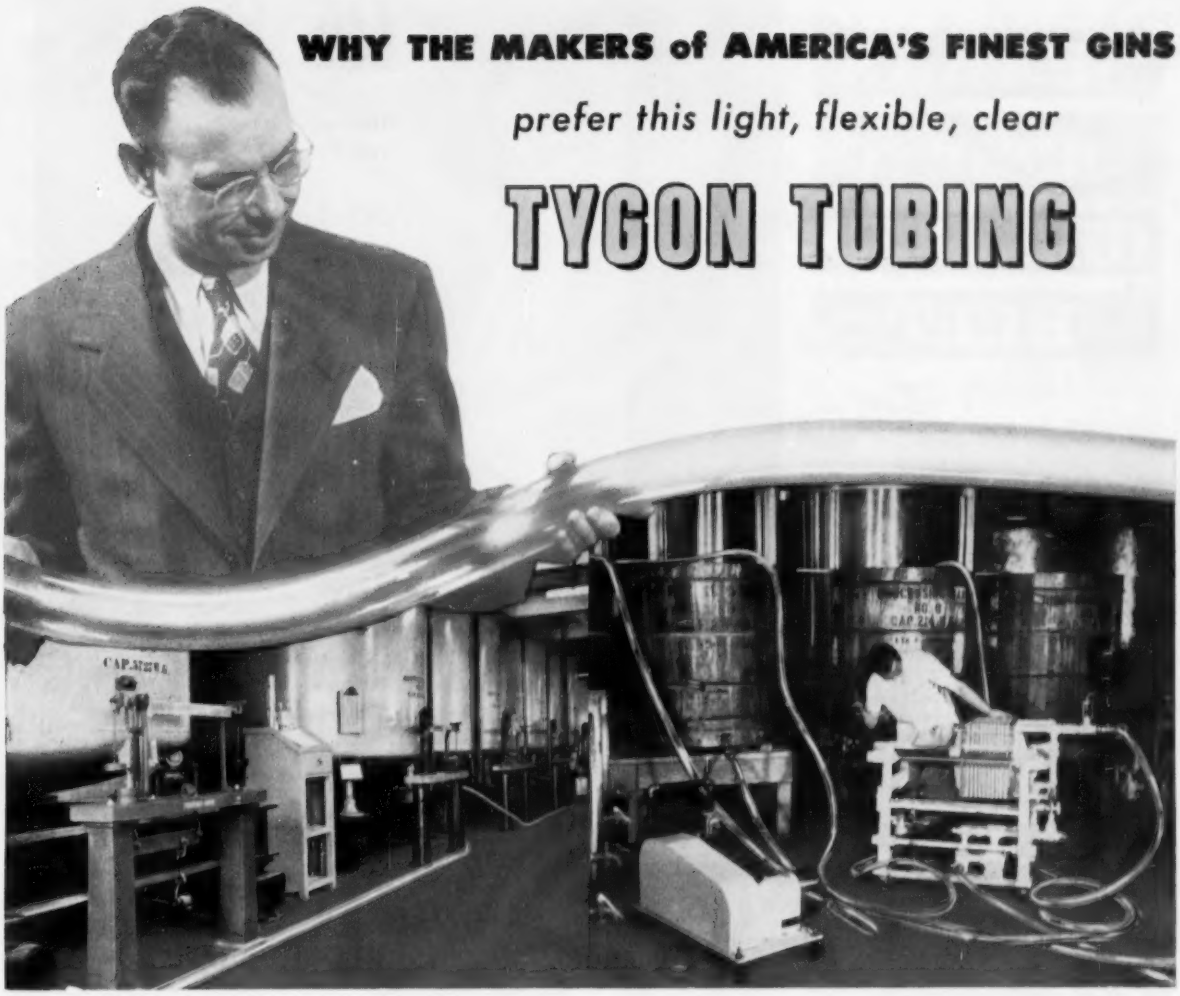
Automatic Mixer

Covers a thermostatic mixing valve for automatically combining hot and cold water, or other liquids. Bulletin 5220, 4 p.—*Lawler Automatic Controls, Inc., Mount Vernon, N. Y. (220P)*

WHY THE MAKERS of AMERICA'S FINEST GINS

prefer this light, flexible, clear

TYGON TUBING



The problem of transporting water white gin from bottling tank to bottling machine was long a headache to its makers. The piping had to be flexible to permit the use of portable pumps. Rubber hose began to show signs of deterioration under the action of the alcohol within a few months. Particles of rubber would flake loose to show up only after the gin was bottled in clear glass. And rejections are costly.

Tygon plastic Tubing solved this problem as it solves many problems in safe transport of foods and beverages. Tygon is unaffected by food acids or by alcohols. It is glass clear, enables inspection to spot any foreign matter all along the line. Tygon's light weight appeals to the worker. It is easily handled. Easy to connect and disconnect. It is tough and sturdy, takes floor abrasion in its stride.

And, of course, of first importance to any manufacturer of food products, Tygon Tubing will not contaminate or affect the most delicate food products. It is completely non-toxic, completely safe to use. It can be sterilized. Its polished interior surface facilitates cleaning and its glass clearness automatically sets up high standards of cleanliness.

PRODUCT OF

U.S. STONEWARE

Plastics and Synthetics Division

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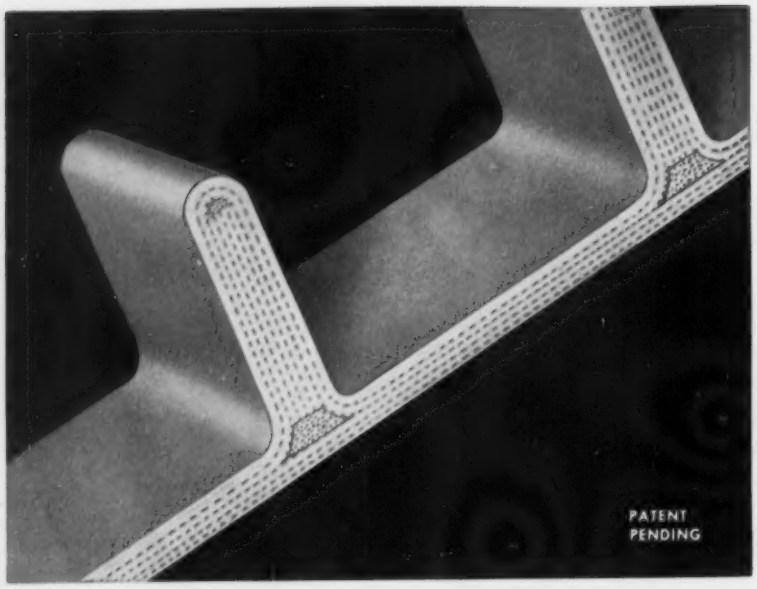
Tygon Tubing Formulation B 44-3 should be specified for food and beverage use. Bulletin T-87 describes Tygon Tubing formulations, gives full technical detail, physical and chemical characteristics. Write for it today. Address Dept. FE955———Plastics and Synthetics Division, The U. S. Stoneware Co., Akron 9, Ohio.

SPARKS *improved* CLEATED BELT



Look at it! It's new! It's tested! It's OK!

Note how the cleats and the body of the belt are one continuous piece, and how the welded wedges and reinforcements, completely vulcanized, become an inseparable part of it. No laps, no gaps, no cracks or crevices. No bolts, no rivets or metal.

Sparks **improved** Cleated Belt can be made any height, width and spacing, and as stiff or as flexible as desired. Will flex around pulley diameters compatible with weight of the belting . . . **This** is **the** belt for food handlers — for sanitation, resistance to bacterial development and easy cleaning.

47 different types and weights available to meet any food processing need. Furnish us with operating data and we will recommend the right cleated belt (the new improved) for any particular requirement.

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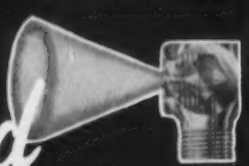
This emblem appears on all Sparks Belting — Ny-Tex, Sno-Tex, Kotton-Top, Tred-Tex, Golden-Tex, Neoprene, etc. Send for particulars.

SPARKS BELTING

THE SPRAY NOZZLES You Need



You'll find the nozzle to meet your specific requirements in the complete selection offered by Delavan . . . one of the world's leading producers of high quality precision nozzles.

Write for

CATALOG 32

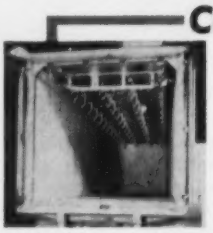
Gives complete details and specifications on the complete Delavan line of industrial spray nozzles.

DELAVAN *Manufacturing Co.*

West Des Moines, Iowa

Speed Loading and Unloading of Meats... Cut Handling Costs

***with the* PHILADELPHIA TRAMRAIL ME-TRACKER**



1. Interior view of a typical ME-Tracker installation in a trailer.

2. Here is meat handling simplified. The ME-Tracker couples to plant's meat tracking system for quick loading and unloading.

The Philadelphia Tramrail ME-Tracker is a "JOB-ENGINEERED" meat tracking system designed and manufactured for installation in any truck or trailer to expedite the handling of meats... save on extra handling costs.

Operation is simple and quick. Truck or trailer is backed to the loading platform, coupling is made with the ME-Tracker and the interior tracking system and meat is moved easily from either platform or vehicle.

Trucks and trailers move in and out faster, waiting time is cut. This means faster deliveries and considerable savings in handling time and costs. Direct coupling of the ME-Tracker to the interior meat tracking system in a cold storage plant or warehouse provides time and cost saving advantages.

Installation can easily be made by truck or trailer manufacturer, your body builder or us.

ME-Trackers are available with either steel or aluminum rails. The ME-Tracker is rugged and built for heavy duty service. Little or no maintenance is required.

To get all the advantages of the ME-Tracker, write us or have your refrigeration engineer, truck or body builder do it. There is no obligation.

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Safety Controls

The why and how are presented for application of basic safety controls to hot water space heating boilers. Booklet offers specific recommendations. Bulletin P-30, 8 p.—*McDonnel & Miller, Inc., Chicago.* (223A)

Packaged Air Compressor

Facts and illustrations tell the story of a close-coupled motor and compressor package. It has two-stage compression and air-cooling. Capacity is 80 to 125 psi., and machine develops 125 hp. Form 3188, 4 p.—*Ingersoll-Rand, New York City.* (223B)

Corrosion Resistant Piping

Folder details corrosion resistant properties of two types of alloy tubing and pipe. Mechanical and physical properties tabled. 3 p. —*Carpenter Steel Co., Alloy Tube Div., Union, N. J.* (223C)

Automatic Controller

Operation and installation data given for use of a pneumatic-electric transducer, used in automatic control of processing operations. Bulletin EB-1, 4 p.— *Conoflow Corp., Philadelphia.* (223D)

Motor Line

Single phase, polyphase, and dc motors depicted with explanatory text. Drives are available in ¼ to 30 hp. range. Bulletin SDA 155, 8 p.—*Peerless, Electric Co., Warren, Ohio.* (223E)

Metering Pumps

Considers a series of controlled volume pumps for chemical metering service. Data includes information on simplex and duplex models and their capacities, pressures, and mounting dimensions. Bulletin H20-1, 4 p.—*Milton Roy Co., Philadelphia.* (223F)

Flexible Hose

Application such as air conditioning, fume removal, and materials handling are discussed in five new bulletins dealing with a corrugated hose. Price list is included. Bulletins 40, 41, 42, 43, and 44, 20 p.—*Flexaust Co., New York City.* (223G)

Diaphragm Pumps

Photos, data, and a series of drawings explain construction, mechanism, and operation of an adjustable-stroke, diaphragm pump line. Bulletin P8-B9, 4 p.—*Denver Equipment Co., Denver.* (223H)

Plastic Properties

Concerns products derived from polyethylene and unplasticized polyvinyl chloride plastic materials. Tables of physical and chemical properties included.—*American Agile Corp., Bedford, Ohio.* (223I)

Automatic Speed Control

Colorful booket details pneumatic system for control of motor drive speeds through measurement of process variable. Operational drawings illustrate method. Bulletin 1882, 8 p.—*U. S. Electrical Motors, Inc., Los Angeles.* (223J)

Jacketed Piping

Gives data on line of jacketed iron and steel pipes and fittings. Double wall construction maintains even temperature in material being piped. Bulletin J-50, 8 p. —*Hetherington & Berner, Inc., Indianapolis.* (223K)

Valves, Fittings

Tabbed catalog lists wide line of valves, fittings, assemblies, tank gages, joints, and other accessories. Catalog 18, 90 p.—*OPW Corp., Cincinnati.* (223L)

MAINTENANCE

Lubricant Line

Chart folder details physical information and typical uses for 44 colloidal and semi-colloidal lubricating products. 'Dag' Dispersions for Industry. 4 p.—*Acheson Colloids Co., Port Huron, Mich.* (223M)

Maintenance Planning

Booklet outlines method for planning cleanup maintenance. Covers washing, sweeping, and waxing operations and discusses allotment of workers. 15 p.— *National Sanitary Supply Assoc., Chicago, Ill.* (223N)

Flexible Shaft-Coupling

Concerns use of a flexible shaft-coupling to prevent accidental shaft mis-alignment and to minimize load shocks. Unit is available for use on light or heavy duty motors. Bulletin 53, 4 p.— *Smith & Serrell, Inc., Newark, N. J.* (223O)

Steel Storage Equipment

Depicts line of steel storage bins, cabinet shelves, and work benches. Specifications are given and uses are covered. Catalog 702, 16 p.—*Frick-Gallagher Mfg. Co., Wellston, Ohio.* (223P)

Shaft Seals

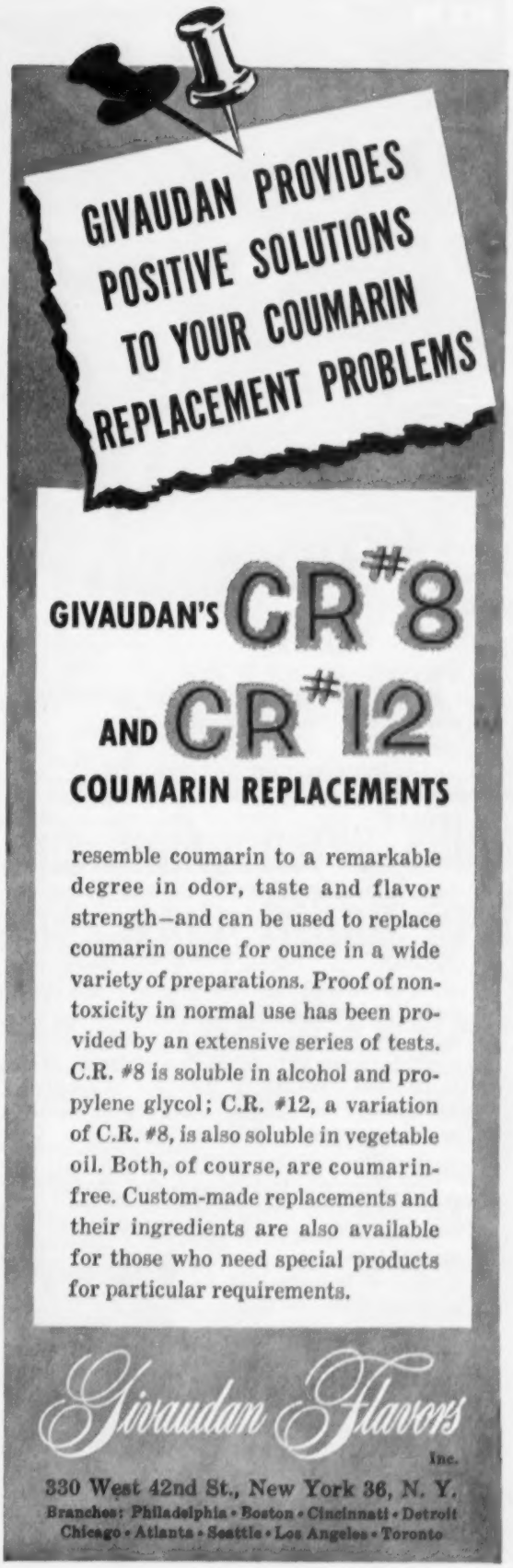
Chart gives full selection data for a wide line of pressure balanced shaft seals. 4 p.—*Gits Bros. Mfg. Co., Chicago.* (223Q)

Tube Fittings

Covers complete line of flareless tube fittings for copper instrumentation lines. Available for tubing sizes 4 through 16. Catalog 4324, 12 p.—*Parker Appliance Co., Cleveland.* (223R)

V-Belt Line

Discusses and specifies line of super, steel cable, open end, and hexagon V-Belts. Tips on selec-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REPLACEMENT PROBLEMS
GIVAUDAN'S CR #8
AND CR #12
COUMARIN REPLACEMENTS
resemble coumarin to a remarkable degree in odor, taste and flavor strength—and can be used to replace coumarin ounce for ounce in a wide variety of preparations. Proof of non-toxicity in normal use has been provided by an extensive series of tests. C.R. #8 is soluble in alcohol and propylene glycol; C.R. #12, a variation of C.R. #8, is also soluble in vegetable oil. Both, of course, are coumarin-free. Custom-made replacements and their ingredients are also available for those who need special products for particular requirements.
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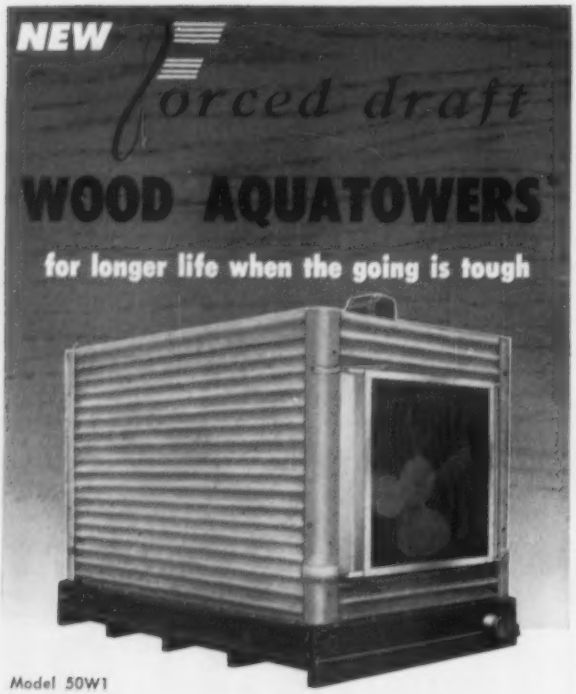


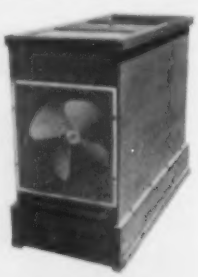
Model 50W1

Marley offers a new series of cooling towers specifically designed to combat corrosive atmosphere and water . . . to "go the full distance" under the most rigorous operating conditions.

All-redwood structure and heavy asbestos cement board or wood casing—both impervious to corrosion — are a positive guarantee of prolonged service life. In the Marley forced draft design the fan and mechanical equipment have the advantage of being out of the discharge air stream.

But regardless of your climate, there will be times when you'll specify these new towers because of their attractive appearance and their unique adaptability to almost any location. Because air discharge is vertical, wind direction is not a factor in locating Forced Draft Wood Aquatowers. Smaller models are factory assembled and the larger models can be hoisted on standard freight elevators because they are shipped disassembled.

New Forced Draft Wood Aquatowers are available in 10 models for services from 3 to 50 tons. Ask your nearby Marley Sales Engineer for a copy of Bulletin FDWA or write direct to Marley, world's leading producer of cooling towers for air conditioning and refrigeration.



*Trademark reg. Model 5W2

MARLEY **The Marley Company**

Kansas City, Missouri

tion and installation also given in extensive catalog. Bulletin v-55, 24 p.—*Maurey Mfg. Corp., Chicago. (223S)*

Finishing Operations

Booklet outlines, and pictures equipment used in wet blasting operation for cleaning and finishing castings and other metal parts. Unit makes use of a micro-fine abrasive. Bulletin 451-D, 18 p.—*American Wheelabrator & Equipment Corp., Mishawaka, Ind. (224A)*

Casters & Wheels

Photos and charts make for easy selection of casters and wheels from a wide line of light, medium, and heavy duty steel and rubber-tread units. 28 p.—*Rapids-Standard Co., Inc., Grand Rapids, Mich. (224B)*

Controlled Maintenance

Booklet offers engineering consulting service that specializes in setting up controlled maintenance systems. Charts illustrate savings said to result from installation of these programs. 17 p.—*Fraser, Weir & Assoc., Inc., Chicago. (224C)*

Silver Brazing

What it does and how to apply it are fully covered in booklet detailing applications and uses of low-temperature, silver alloy brazing compounds. Bulletin 20, 24 p.—*Handy & Harmon, New York City. (224D)*

Roller and Ball Bearing

Comprehensive catalog gives full details on line of roller and ball bearing pillow block and flange bearings. Bulletin A-638, 52 p.—*Dodge Mfg. Corp., Mishawaka, Ind. (224E)*

Protective Coatings

Technical paper presents a discussion on use of organic protective coatings, with information as to proper selection. 19 p.—*Atlas Mineral Products Co., Mertztown, Pa. (224F)*

Dry Film Lubrication

Folder contains material that indicates possibilities of a dry film lubrication system, said to work equally well at high or low temperatures and to be specially adaptable to sealed or inaccessible assemblies. — *Electrofilm, Inc., North Hollywood, Calif. (224G)*

MATERIALS HANDLING

Steel Band Conveyors

Comprehensive, hard-cover book gives extensive engineering data on solid steel-band conveyors. Pictures show component parts and different applications. 48 p.—*Sandvik Steel Belt Conveyors, Fair Lawn, N. J. (224H)*

Pan-Type Conveyors

Single-sheet construction detailed to illustrate advantages of a line of pan-type conveyors for handling sticky, hot, abrasive and corrosive materials. Bulletin 3255, 4 p.—*Simplicity Engineering Co., Durand, Mich. (224I)*

Special Conveyor Belts

Data sheet specifies special rubber conveyor belt construction such as: riffle grip, step-ply, reinforced cover, flanged, and wire-insert types. Advantages are pictured and discussed. Sheet 2255, 2 p.—*B. F. Goodrich Co., Akron, Ohio. (224J)*

Electric Fork Truck

Features, data, and advantages are discussed for 2,000-lb.-model, standup electric fork truck. Photos illustrate applications. 10 p.—*John Morrell Mfg. Co., Elgin, Ill. (224K)*

Materials Handling Tips

Three field reports on meat products plants give tips and diagrams for well-planned materials handling systems. Cost-cutting information included. Reports 9, 17, and 60. 12 p.—*Rapid-Standard Co., Inc., Grand Rapids, Mich. (224L)*

Fork Truck Lease Plans

Facts and figures given for both rental and time-purchase plans for fork truck equipment. Purchase plan runs from 6 to 36 months. Lease plans for 3 or 5 years. 6 p.—*Towmotor Corp., Cleveland. (224M)*

Automatic Palletizer

Many photos and diagrams illustrate operation of automatic case palletizer. Pallet-load patterns are pre-set at control panel. Machine is said to handle all types of pallets. *FMC Lock-Load Palletizer,* 8 p.—*Food Machinery & Chemical Corp., Riverside, Calif. (224N)*

Conveyor Line

Catalog details and pictures extensive line of power and gravity conveying equipment and accessories. Catalog GC-54, 16 p.—*Rapids-Standard Co., Inc., Grand Rapids, Mich. 224O)*

Conveyor Components

Illustrates line of bearings, screws, chains, buckets, pulleys, and rollers used in conveyor installations. Booklet 888, 48 p.—*Jeffrey Mfg. Co., Columbus, Ohio. (224P)*

Carton Unloader

Concerns operation of an automatic carton unloader that opens case flaps and transfers containers to unscrambler. Unit is said to reject cracked bottles. Bulletin SV-1, 4 p.—*Island Equipment Corp., Long Island City, N. Y. (224Q)*

Electric Truck

Specifications detailed for 8,000-lb.-capacity electric powered fork truck. Close-up photos of component parts illustrate rugged construction. Bulletin F-39T8, 4 p.—*Elwell-Parker Electric Co., Cleveland. (225A)*

Overhead Conveyor

Information on chain-type, overhead conveyor that takes vertical and horizontal bends. Diagrams key component parts and drive mechanism. 8 p.—*Chain-O-Flex Corp., Franklin Park, Ill. (225B)*

Walking High-Lift Truck

Specifications and features depicted for a walking-type, electric high lift truck. Has total lift of 121 in. and 2,000-lb. capacity. Bulletin 551-2, 4 p.—*Barrett-Cravens Co., Northbrook, Ill. (225C)*

Single-Mast Fork Truck

Folder shows new single-mast fork truck that provides high visibility for driver.—*Hyster Co., Portland, Ore. (225D)*

Vacuum Lifter

Information on a suction-cup vacuum lifter for use on fork trucks, cranes, and hoists. Will lift curved or flat objects. 4 p.—*Blakeslee Mfg. Co., Herrin, Ill. (225E)*

Nylon Chain Conveyor

Pictures and facts on a new nylon, link-chain conveyor, said to have low initial cost and high sliding-wear resistance. Other features claimed, are a reduction in noise, elimination of lubrication, and an attractive appearance. Bulletin 55-65, 4p.—*Chain Belt Co., Milwaukee, Wis. (225F)*

PROCESSING

Metal Filter

Concerns development of a sintered bronze filter, said to withstand corrosive media and have long life-span. Profusely illustrated. 16 p.—*Permanent Filter Corp., Los Angeles. (225G)*

Filler Catalog

Contains pictures and complete specifications for line of M & S fillers in models ranging from 4 to 30 pockets. 16 p.—*Food Machinery & Chemical Corp., Hoopeston, Ill. (225H)*

Solids Separator

Treats of continuous contact column that acts to separate solids from liquids by a counter-current principle. Unit is available in capacities up to 1,000 tons per day. Leaflet 07R8289, 4 p.—*Allis-Chalmers Mfg. Co., Milwaukee. (225I)*

Candy Making

Booklet, written to accompany a 20-min. industrial film, details equipment needed for small-scale manufacture and testing of candy. 11 p.—*Atlas Powder Co., Chimicals Dept., Wilmington. (225J)*

Milk Processor

Covers operation and advantages of a unit that separates, standardizes, and clarifies milk and cream. Machine handles up to 4500 lb./hr. Bulletin 1277, 4 p.—*Sharples Corp., Philadelphia. (225K)*

Tomato Concentrator

Diagrams and charts give specifications for a line of three tubular evaporators for production of high density tomato paste. Bulletin 320-13, 4 p.—*Mojonnier Bros., Co., Chicago. (225L)*

Mixer-Cooker

Concerns action of an agitator-equipped mixing and cooking kettle. Kettle is steam-jacketed, and mixer is available with a choice of several different beaters or paddles. Data Sheet H-16, 4 p.—*Hamilton Copper & Brass Works, Cincinnati. (225M)*

Vibrating Equipment Line

Details of a wide line of vibrating elevators, sieves, and feeders. Also listed are bin vibrators and pneumatic tools. Catalog 554, 40 p.—*Servad, Inc., Indiana, Pa. (225N)*

Stainless Steel Tanks

Concerns three-model line of open top, stainless steel tanks, complete with covers. Units are available with side- or bottom-entering agitators, and come in sizes from 60 to 500 gal. Bulletin G-502, 2 p.—*Cherry-Burrell Corp., Chicago. (225O)*

Heat Exchangers

Concerns features of shell-and-tube heat exchangers, designed principally for oil heating and cooling. Bulletin HT-1, 4 p.—*Schutte & Koerting Co., Cornwells Heights, Pa. (225P)*

Round Processing Tanks

Available in capacities from 300 to 1,000 gal., a series of round processing tanks are described as being specifically designed for efficient cooling, pasteurizing, mixing, and blending. Channel-wall construction for steam, and direct-expansion refrigeration provide fast hot-and-cold operation. Bulletin G-472, 16 p.—*Cherry-Burrell Corp., Chicago. (225Q)*

Milk Processing Tank

Treats of dual-wall milk processing tank with direct expansion refrigeration, heating system, and a top mixer that can be equipped with several blades for different products. Bulletin B-1235, 2 p.—*Creamery Package Mfg. Co., Chicago. (225R)*

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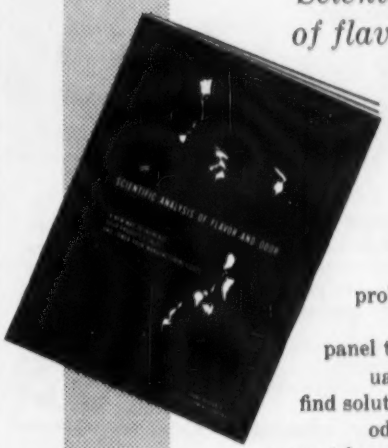
Scientific analysis of flavor and odor



It may suggest answers to *your* flavor and odor problems. Read how Evans sensory panel technique of evaluation can help you find solutions to flavor and odor problems that cannot be solved by chemical analysis — or any other method of testing.

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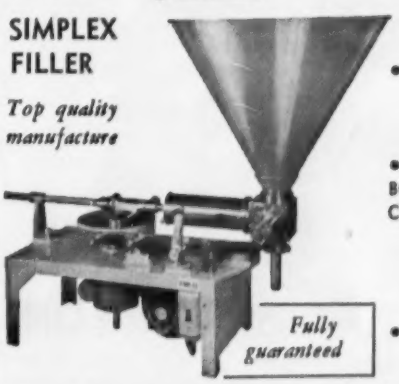

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INSTRUMENTS

Viscometer-Type Controllers

Booklet gives principles and background research of a line-installed viscometer control. Unit employs shearing-force method of viscosity measurement. 12 p.—*Drage Rheometers, Union City, N. J. (226A)*

Automatic Control Systems

Applications to different industries are discussed in booklet concerning graphic, automatic control panel systems. Pictures show appearance of the different models. Bulletin S-10, 14 p.—*Automatic Temperature Control Co., Philadelphia. (226B)*

Oven Wattage Control

Relates feature of new oven wattage controller that uses maximum power only on warm-up, then automatically modulates minimum wattage in relation to temperature and work load. 8 p.—*Soiltest, Inc., Chicago. (226C)*

Electronic Timer

Concerns action of an interval, delayed action, repeat cycle, and two-sequence timer. Diagrams illustrate electronic operation. Bulletin T-1, 2 p.—*Ferrara, Inc., Oak Park, Mich. (226D)*

Chlorine Analyzer

Informs on unit that automatically and continuously measures and records chlorine content in treated water. Accuracy and low maintenance costs are stressed. Data Sheet ND-4694(1), 2 p.—*Leeds & Northrup Co., Philadelphia. (226E)*

Pneumatic Flow Control

Information relative to a method for temperature control through varying the input of steam, gas or other heating media. A pneumatic valve or motor is used. Adjustments are made by a knob on the compact case. Bulletin 151, 2 p.—*Burling Instrument Co., Chatham, N. J. (226F)*

Midget Thermostats

Lists line of midget-type thermostats and motor protectors and specifies operational features. 4 p.—*Franklin Dales Co., Akron. (226G)*

Automatic Process Control

A discussion of component parts in an automatic electronic process control system. Process variables are converted to small voltage by primary sensing elements and relayed to control center, which may be located anywhere up to 15,000 ft. away. Illustrations are included. Bulletin A1.3-1, 4 p.—*Swartout Co., Cleveland. (226H)*

Preset Counters

Concerns unitized modular counters that are set at numbers within the counting range. When preset number is reached, a built-in relay is actuated and can be coupled to other equipment to give process control. 4 p.—*Atomic Instrument Co., Cambridge, Mass. (226I)*

Pneumatic Transmitter

Supplementary information offered on a pneumatic transmitter that actuates instrument mechanisms. Advantages, operation, and performance data are discussed. Bulletin 285-L2A, 4 p.—*Builders Providence, Inc., Providence. (226J)*

Remote Depth Gages

Full data on line of remote-reading depth gages for liquid-level indication in storage tanks and pressure vessels. Accessories listed for special applications. Bulletin 6004, 8 p.—*Liquidepth Indicators, Inc., Long Island City, N. Y. (226K)*

Pressure Pilot

Considers uses of a new pressure indicating and controlling pilot for installation on automatic control valves. Gives running pressure of fluid being controlled. Dial hand controls process variable. Quick setting gives direct or reverse action. Bulletin 110, 10 p.—*Hammel-Dahl Co., Providence. (226L)*

Controller Catalog

Composite catalog briefly describes wide line of industrial controls including starters and temperature, pressure and level instruments. Bulletin 5002, 24 p.—*Minneapolis-Honeywell Regulator Co., Wayne & Windrim Ave., Philadelphia. (226M)*

PACKAGING

Glue-Line Uses

Handy pocket card pinpoints specific uses of a line of packaging glues. *H. B. Fuller Co., St. Paul, Minn. (226N)*

Wrapping Machine Line

Pictures line of wrappers for irregular products. Units will also handle boxes or packages with stiffeners at speeds up to 300 units per min. 4 p.—*Hudson-Sharp Machine Co., Green Bay, Wis. (226O)*

Paper Samples

Booklet contains samples of a line of kraft papers in a variety of weights and also colors.—*Crown Zellerbach Corp., San Francisco. (226P)*

Colored Tapes

Illustrates series of colored tapes for packaging produce or other products in plastic bags. Dispensing equipment available. 4 p.—*Permacel Tape Corp., New Brunswick, N. J. (226Q)*

Strapping Tools

Data Sheet pictures and specifies line of tools for applying steel strapping. Strapping, wagons, and accessories also detailed.—*Inland Wire Products Co., Chicago. (227A)*

Neck Bander

Close-up views reveal operation of machine for applying cellulose neck band seals to bottled products. Speeds to 150 units/min. 6 p.—*Gisholt Machine Co., Madison, Wis. (227B)*

QUALITY CONTROL

Lab Vacuum Pump

Specifications and operational data discussed for a laboratory-sized vacuum pump. Unit will displace 41 l. of free air per minute. Circular 1209B, 1 p.—*Central Scientific Co., Chicago. (227C)*

Distillator and Baths

One release covers facts and features of new distillation apparatus. Second brochure concerns line of constant temperature baths, featuring close control of heating factor. Bulletins 4030 and 3030, 4 p.—*Labline, Inc., Chicago. (227D)*

Infrared Spectrophotometer

Standard performance curves and operational data present features of a compact, infrared spectrophotometer said to give high resolution and great quantitative accuracy. Bulletin 410, 4 p.—*Beckman Instruments, Inc., Fullerton, Calif. (227E)*

Chemical Supplies

Of interest to researchers is new catalog showing wide listing of chemicals for laboratory and commercial use. 36 p.—*Eastman Chemical Products, Inc., Kingsport, Tenn. (227F)*

pH Indicator

Full details and specifications given for ph meter equipped with manual and automatic temperature compensation. Accessories that are available with the unit are listed and described. Data Sheet E-96, 4 p.—*Leeds & Northrup Co., Philadelphia. (227G)*

Cone-Plate Viscometer

Literature pictures and describes operation of a new cone-and-plate type, rotary viscometer. Thermocouples embedded in plate give accurate temperature readings. Water-jacketing is provided for constant temperature control. 12 p.—*Ferranti Electric, Inc., New York City. (227H)*

Electron Microscope

Question and answer booklet explains common problems relating to operation of electron microscopes and gives various process applications. 8 p.—*North American Philips Co., Inc., Research & Control Instruments Div., Mount Vernon, N. Y. (227I)*

Vapor Analyzer

Treats of a vapor fractometer for analysis of gases and low-boiling liquids. Diagrams show operation and construction. Components are detailed. Bulletin 154, 6 p.—*Perkin-Elmer Corp., Norwalk, Conn. (227J)*

Refractometer Line

Full details on line of hand and table-model refractometers. operational data, uses, and a price list are included. Catalog D-202, 16 p.—*Bausch & Lomb Optical Co., Rochester. (227K)*

Radioactivity Monitor

Folder specifies uses and accuracy of a battery-powered pocket monitor for checking radioactive contamination and exposures. Unit can be set for high or low sensitivity. Form PW 4010, 4 p.—*North American Philips Co., Inc., Mount Vernon, N. Y. (227L)*

Laboratory Blender

Information on Waring Blendor unit for pulverizing, chopping, and blending laboratory materials. Available accessory is a surface cooler sized to fit standard blender bowl. Circular 1241A, 6 p.—*Central Scientific Co., Chicago. (227M)*

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INGREDIENTS

Flavor Line

Illustrated catalog lists and prices over 700 varieties of flavors. Distribution of this book limited to buyers of wholesale quantities. 20 p.—*Fritzsche Bros., Inc., New York City. (227N)*

Mold & Yeast Inhibitor

Technical discussion presents properties and possible food product uses for sorbic acid. It inhibits mold and yeast development. 8 p.—*Carbide & Carbon Chemicals Co., New York City. (227O)*

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Pektizyme also imparts a selling personality to apple and grape juices by giving them the brilliance, clarity and polish that consumers prefer — without affecting the flavor and bouquet of the juice.

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Prevention is the Crux

—*Continued from page 91*

ager runs the meeting (which never last more than an hour). More frequently, however, there is a rotating chairmanship. All employees are requested to fill out reports on any unsafe acts they see, without naming persons involved. These reports, also specifying accidents that have occurred, are discussed by the committee.

New employees are shown possible job hazards in their departments by committee members as a part of the indoctrination program.

Weekly inspections are made in the plant by the safety engineer and the chairman and members of the committee. Matters needing attention are noted on the pertinent form (see last illustration), then are brought up for discussion at the weekly meetings.

End (*Resume reading on page 92*)

Air-Flotation Economies

—*Continued from page 107*

meat packer, process water had been discharged directly into city sewers, with sewage charges based on loading. Because of an average flow of 500,000 gal. per day, a high percentage of byproduct materials was being lost.

According to E. G. Anderson, superintendent of the company's fats and oils department, this situation was remedied by installation of a flotation unit (Colloidair, made by Bulkley, Dunton Processes, Inc., N. Y. C.), which resulted in—

1. Saving of some $15,000 a year on sewage charges.

2. Recovery of about 10,000 lb. of valuable fats, tallow, and protein solids weekly.

3. And, very important, a treated effluent suitable for discharging directly to the city sewer.

The system is termed virtually automatic and foolproof.

First, waste water is filtered through one of four preliminary catch basins and settling tanks. Flow is continuous, with an average residence time of about 5 min. in 1,500 to 2,000 gal. basins. From here, effluent flows to a main catch basin (10,000 gal.) and is held for 10 to 12 min.

After final settling and flotation, effluent is pumped through a flow control to a closed retention or dwell tank which is divided into two sections by a vertical baffle plate. Use of this tank insures air saturation, complete flocculation, and removal of excess air. Latter is bled from the closed tank as water passes over the baffle.

At the same time, desired pressure is maintained, regardless of flow variations, by an automatic, air-operated control valve at the separator inlet. Pressure on the retention tank is about 35 psi.

At this point, alum is injected from a chemical feed system to coagulate the particles. Positive ions of aluminum sultate are attracted to negative particles in the sewage. Next, flow is passed into a degasification and stilling chamber, where it is distributed across the top of the inlet section of the flotation tank at a fixed level.

From the time effluent leaves the control valve, all process steps are visible. These include: Chemical flocculation, degasification, particle separation and fat collection, suspensoid float collection, removal and compaction of float mat on the recovery apron, and discharge of clarified effluent.

Maintenance problems encountered in vacuum deaeration procedures are avoided through pressure-dissolving of air, since ultimate leakage to the atmosphere is the desired effect. Entire process takes about 12 min., as opposed to 1 to 4 hr. required for other clarification methods.

End (*Resume reading on page 108*)

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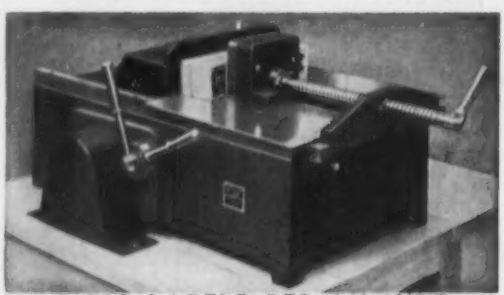

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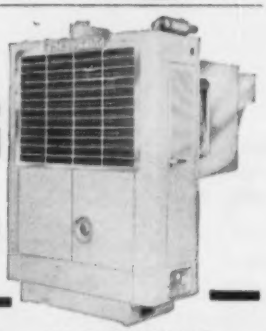

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If you need a special gasket, seal, diaphragm or protective cloth material in your design—why not try a Du Pont coated fabric or sheet stock? You can obtain the exact combination of properties you need with the proper fabric and coating. Heat resistance with good "release," abrasion resistance with superior flexibility, oil resistance with high strength—these and many more combinations are possible.

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Whatever the emergency is, everybody's going to want help at the same time. It may be hours before outside help reaches you. The best chance of survival for you and your workers—and the fastest way to get back into production—is to know what to do and be ready to do it. Disaster may happen TOMORROW. Take these simple precautions TODAY:

☐ **Call your local** Civil Defense Director. He'll help you set up a plan for your offices and plant—a plan that's safer, because it's integrated with community Civil Defense action.

☐ **Check contents** and locations of first-aid kits. Be sure they're adequate and up to date. Here, again, your CD Director can help. He'll advise you on supplies needed for injuries due to blast, radiation, etc.

☐ **Encourage personnel** to attend Red Cross First-Aid Training Courses. They may save your life.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads and official CD films or literature that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good community relations—and no greater way of helping America.

Act now . . . check off these four simple points . . . before it's too late.

PERSONNEL MANAGERS

Looking for Engineers . . . Technicians?

Write for free copy of

"RESERVOIR of ENGINEERS and TECHNICAL MEN"

The engineers and technicians you want to reach are gathered in convenient, compact groups—as this 12-page booklet points out.

It keys the job titles these men hold to the McGraw-Hill publications they read for on-the-job information. It explains how you can make contact . . . channel, concentrate your employment advertising to just the men with the job qualifications you want . . . without wasting advertising money for higher-priced space in publications with general circulation, in which you pay for perhaps 999 unqualified readers for every 1 who may meet your job requirements.

Write for your free copy to
Classified Advertising Division
McGraw-Hill Publishing Co., Inc.
330 W. 42nd St., N. Y. 36, N. Y.

PROFESSIONAL SERVICES

PROCESSING PROBLEMS — PRODUCT DEVELOPMENT — MARKET RESEARCH — PLANT LAYOUT and DESIGN — PACKAGE DESIGN and TESTING MANAGEMENT — PUBLIC RELATIONS — GENERAL CONSULTING — PATENTS — CHEMICAL, BACTERIOLOGICAL and NUTRITIONAL ANALYSIS

FOOD DEVELOPMENT LABORATORY
S. W. ARENSON, *Director*
Ingredient evaluations • New products development. Specialising in flour, shortenings, milk and other basic ingredients • Facilities; chemical and physical laboratory, bakery, spray dryer and other unit process equipment.
2865 W. Franklin St. — 446 W. 24th St.
Baltimore 23, Md. — New York, N. Y.

STRASBURGER & SIEGEL
Chemists—Bacteriologists—Food Technologists
Specialists in Canned and Glassed Foods
Laboratory Services
Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods, Food and Drug Labels, Expert Testimony
1403 Eutaw Place — Baltimore 17, Maryland

JACOBS-WINSTON LABORATORIES, Inc.
Consulting and Analytical Chemists since 1920
James J. Winston, Director
Chemical and Bacteriological Analysis; Plant Sanitation; Filth Analysis; New Product Development; Expert Testimony; Ultra-Violet, Visual, Infra-Red Spectrophotometry; Radioactive Tracers, Analysis for Trace Metals; Air Pollution, Odor and Flavor Controls.
156 Chambers Street — New York 7, N. Y.

DONALD K. TRESSLER AND ASSOCIATES
Gerald A Fitzgerald, *Vice-Pres., Director*
Specialists in Food Formulation, Processing, Quality Control, Testing and Evaluation; Machinery; Packaging; Freezing; Storage; Canning; Dehydration; Sanitation; Water Conditioning; Food Additives; Plant Layouts for Prepared and Pre-Packaged Foods.
Laboratory — North Compo Road — Westport, Conn.

LEWIN ASSOCIATES
Industrial Consultants
DAVID N. LEWIN, Ph.D., FOOD CONSULTANT
JOSEPH D. LEWIN, CONSULTING ENGINEER
Design — Layouts — Investigations — Consultations — Reports — Market Investigations — Bakeries, Dairy Products—Food Preserving by Heat, Drying, Freezing—Consultation in Managing, Warehousing, Distribution — Formulae, New Products.
242 West 56 St. N. Y. 19, N. Y. — JUdson 6-1749

WALTHAM LABORATORIES, INC.
LABORATORY SERVICES: Food analysis, extraneous matter, bacteriological tests. Water.
FOOD PLANT SANITATION — INSPECTION & SAMPLING
817 Moody Street — Waltham 54, Mass.

SCHWARZ LABORATORIES, Inc.
Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvement
Research and Investigations
Legal Testimony
Write for bulletin describing facilities and services
230 Washington St., Mount Vernon, N. Y.

WISCONSIN ALUMNI RESEARCH FOUNDATION
Project Research, Consultation, and Production Control Services in
Biochemistry, Chemistry
Bacteriology, Pharmacology,
and Insecticide Testing and Screening
Write for Price Schedule
P. O. Box 2059-P — Madison 1, Wisconsin

FOSTER D. SNELL
Research Laboratories
SENSORY PANEL TESTS
Food Analysis, Stability Studies, Evaluations, Packaging Problems, Vitamin Assays.
Write For "Food Facts"
29 W. 15th St., N. Y. 11 — WAtkins 4-8800

Ingredients
For the Food Processor

WHEN TIME IS SHORT . . . .
put the solution of your problems up to a specialized Consultant whose professional card appears on this page. His broad experience may save you months of costly experimentation.

CARROT OIL makes food golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!
NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant
Positions Wanted
Part Time Work

Civil Service Opportunities
Selling Opportunities Wanted
Selling Opportunities Offered

Employment Agencies
Employment Services
Labor Bureaus

DISPLAYED

The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

——RATES——

UNDISPLAYED

$1.50 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS to FOOD ENGINEERING, 330 W. 42nd St., N. Y. 36, N. Y. for October issue closing September 26th

CAN MANUFACTURER WANTS

an experienced man capable of supervising and operating automatic high speed-sanitary can lines. Excellent opportunity for a good man to assure himself of a permanent job with a good future. Salary open. Call or write to:

ATLAS CAN CORPORATION
50th St. & 1st Ave., B'klyn 32, N. Y.
STerling 8-1040

ENGINEER
Production and Packaging

Dynamic, rapidly growing, nationally known candy bar manufacturer requires the permanent services of an engineer with practical experience and a special knowledge of mass production, plant layout and design, construction supervision, and packaging machinery.

Man selected will initiate and head Engineering Department with responsibility for developing labor and cost saving techniques for production.

Our company, located in Metropolitan New York, has been first in many precedent setting moves; hence, we are looking for an individual capable of creative, independent thinking with a sound and practical application.

Individual will probably be experienced graduate mechanical engineer between 35 and 50.

Include availability and salary expected in complete resume.

P-7613, Food Engineering
330 W. 42 St., New York 36, N. Y.

SALES OPPORTUNITY

Established midwest manufacturer entering food packaging machinery field, seeking capable sales executive. Requires knowledge of retail food selling, packaging machinery and a successful record in national selling. This is an unusual opportunity for a superior salesman or junior executive ready for larger position. Our employees know of this advertisement. Reply

SW-7554, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

WE NEED

FOOD TECHNOLOGISTS and FOOD CANNING CANDIDATES
—Junior to top-level

Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
220 S. State St., Chicago 4, Ill.
HArrison 7-8600

TRAINEES

Yng food technologists, Chem. Engrs., etc. to learn feed and milling business. Degree preferred. To $425 mo.

CONTACT Bob Peore
O'SHEA EMPLOYMENT SYSTEM
"America's Largest"
64 E. Jackson — Chgo. Ill.
Tel. WAbash 2-1884

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)
LOS ANGELES: 1111 Wilshire Blvd. (17)

POSITION VACANT

Position open as Research Chemist with prominent specialty corn mill. Applicant should be a cereal chemist with experience in product development and production. Opportunity for advancement to executive position. Age preferably 35-40. Reply giving full resume with snapshot. State salary expected, address, box number. P-7272, Food Engineering.

EMPLOYMENT SERVICE

Salaried Personnel. $5,000-$30,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, P.O. Box 674, Manchester, Vermont.

POSITIONS WANTED

Food Technologists-Executive. B.S., M.I.T. 12 yrs. varied responsible experience in quality control, new product development, administration, advertising, packaging, and merchandising. Seeks greater opportunity than at present. PW-6696, Food Engineering.

Sanitation Director: Sixteen years experience health regulatory agencies, private industry. College graduate. My knowledge equipment construction, plant cleaning methods, pest control, food quality control, health laws, personnel training, will pay you dividends. Presently employed, desire change progressive organization. Excellent references. PW 7309, Food Engineering.

Production & Research Chemist, with extensive experience in manufacture, development, control of a wide line of confectionary products, desserts, cereal products, desires a position of responsibility. PW 7447, Food Engineering.

Manager-Administrator, food processing or allied industry, for whom people produce—and like it! Heavy quality control, practical research, development. Presently Plant Manager, Chem. Engr. age 41. Chicago area preferred, but will listen to reason. PW 7364, Food Engineering.

PROJECT ENGINEER

A leading manufacturer in field has opening for Project Engineer in product development division. Must be graduate engineer. Two to five years experience desired in food processing machinery or machine design. Unlimited opportunity in fast growing manufacturing company. State education, experience and age. Reply to

P-7428, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

FOOD CHEMIST

Young man with technical training & interest to enter Food Field on General analysis & product improvement work for large food manufacturing Co. in Midtown Manhattan. Experience in Food Field Helpful. All benefits. Forward Brief resume & Salary Requirements. No references contacted without permission.

P-7468, Food Engineering
330 W. 42 St., New York 36, N. Y.

FOR RATES OR INFORMATION
About Classified Advertising,

Contact The McGraw-Hill Office Nearest you.

ATLANTA, 3
1321 Rhodes-Haverty Bldg.
WAlnut 5778

LOS ANGELES, 17
1111 Wilshire Blvd.
MAdison 6-4323

BOSTON, 16
350 Park Square
HUbbard 2-7160

NEW YORK, 36
330 West 42 St.
LOngacre 4-3000

CHICAGO, 11
520 No. Michigan Ave.
MOhawk 4-5800

PHILADELPHIA, 3
17th & Sansom St.
RIttenhouse 6-0670

CLEVELAND, 15
1510 Hanna Bldg.
SUperior 1-7000

PITTSBURGH, 22
919 Oliver Bldg.
ATlantic 1-4707

DALLAS, 1
First Nat'l Bank Bldg.
PRospect 7-5064

ST. LOUIS, 8
3615 Olive St.
LUcas 4867

DETROIT, 26
856 Penobscot Bldg.
WOodward 2-1793

SAN FRANCISO, 4
68 Post St.
DOuglas 2-4600

SEARCHLIGHT SECTION

(Classified Advertising)

BUSINESS OPPORTUNITIES — EQUIPMENT - USED or RESALE

UNDISPLAYED ——RATES—— *DISPLAYED*

$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line. BOX NUMBERS count as one line additional in undisplayed ads.
DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

The advertising rate is $13.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.
EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW ADVERTISEMENTS to N. Y. Office, 330 W. 42nd St., N. Y. 36, N. Y. for October issue closing September 26th

October Specials

U. S. 2 spout EZ Bottle Air Cleaner
Standard-Knapp Wrap-around Labelers
SS 24 cu. ft. Spiral Mixer, never used
Premier 8" SS Colloid Mill, 30 HP mtr.
Pneumatic Scale Labeler, serial 9894
MRM S/S 12 spout Rotary Vac. Filler
Phila. 2 piston S/S Filler, like new
Res.na Capper, LC2, up to 80mm
Capem SIF Capper, Caps up to 88mm.
250 gal. S/S steam jktd. Kettle, 90# press.
S/S Pasteurizer, 200 gal. jktd. & Agtd.

NEW—STEEL & S/S MIXERS KETTLES, TANKS & DRYERS
Fabricated to your Specifications
Engineering Advice Available

WE BUY COMPLETE PLANTS OR SINGLE UNITS
What Have You For Sale?
YOU CAN BANK ON
EQUIPMENT CLEARING HOUSE, INC.
111 33rd Street, Brooklyn, N. Y.
SOuth 8-4451—4452—8782

STOP LOSING TIME AND MONEY

Buy "Consolidated"

Pneumatic Scale Packaging Unit, Double Drum Driers, from 24" x 36" to 42" x 120", Sperry 18" x 18" Plate and Frame Filter Presses, 3-#12 Sweetland Filters with 48 bronze monel covered leaves. Day #30 Jacketed Imp Mixer. Horizontal Dry Powder Mixers, Fillers, Cappers, Driers, Tanks, Kettles, etc.

Wanted: Your Idle Machines or Plants
Send List Today

Our 38th Year

CONSOLIDATED PRODUCTS COMPANY, INC.
56 Bloomfield St., Hoboken, N. J.
Tel.: HO 3-4425 N. Y. Tel.: BA 7-0600

SALE

Filler—Ertel—10 Spout	$ 450.00
Bag Sealer—Seal Vac—Vacuum Type	$ 550.00
Filler—FredGoat—Satchel Bag	$ 850.00
Cello Bag Machine with Label Unit-Amsco	$1100.00
Cello Bag Machine with Label Unit-Amsco	$1540.00
Press—Farquhar—Fruit Press	$1100.00

Located Philadelphia, Pennsylvania—Offered as is, where is, subject to prior sale.

FS-7144, Food Engineering
330 W. 42 St., New York 36, N. Y.

NEW PRODUCT OR FORMULA WANTED for Mexican Manufacturing & Distribution

Mexican company in dry mix field seeks new product under license privilege. Or will import concentrates and reduce to field strength.

BO-7340, Food Engineering
330 W. 42 St., New York 36, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

BUSINESS OPPORTUNITY

Wanted: well rated food company desiring diversification of food products manufacturing by consulting food chemist, 20 years experience with a successful food products manufacturing expansion plan of research and production. BO-6800, Food Engineering.

WANTED

Anything within reason that is wanted in the field served by Food Engineering can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

IN STOCK AT LOEB'S

Cappers: Capem, Titecap, Swanson, U. S. automatic and semi-automatic.
Centrifugals: Fletcher 12" copper, 17" stain. steel, 20" lithcoated, Tolhurst 26" copper.
Clarifiers: De Laval model 84 51.
Collectors, dust: bag 5" dia. x 2½' to 5' long, steel.
Condensers: stainless steel and copper.
Conveyor, port. Rapid Standard, 16' lg.
Conveyor Tables: belts from 5½" wide x 12' long and up.
Cutters, silent: Buffalo 32" and 43".
Dicer: Sterling model EMIC-1/N2.
Dryer: Devine 2 x 4' vac. drum, st. steel.
Dryers: vacuum shelf, Stokes 20 shelf, Devine 10 shelf.
Extractor: Troy 26" monel basket.
Feeders: Syntron F-22, 10 x 36" trough.
Fillers, liquid: Peerless 6 valve, Cass gross weight, siphon and vac. types.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson.
Filter Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: int. pressure — Alsop, Sparkler, Lomax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½x1', Denver 1x3'.
Fryolators: Pitman gas fired, 18" well.
Homogenizer: 400 GPH. st. steel, Manton-Gaulin.
Kettles: Stainless steel 5 to 150 gal., with and without agitators, aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World, Ermold—auto. and semi-auto.
Mills, attrition: 30" 40 hp.
Colloid: Charlotte 3 hp., Premier 3 hp.
Hammer: Mikro 1SH, 2DH, 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffrey 30 x 24", Williams #2 and BX.
Mixers: Dough type single and double arm, 5 to 100 gal.
Powder: 50 to 2000 lb. capacity.
Portable Electric: ¼ to 5 hp.
Pan, vacuum: stain. steel 30 x 48".
Pasteurizer: Wallace-Walker plate type, 200 GPH., st. steel.
Press: Dewatering Davenport 3A.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Retorts: 42 x 72" and 24 x 30".
Screens: Rotex 20 x 48", 42 x 84".
Roball 40 x 120" stainless steel.
Selectro 4 x 10', Abbe Blutergess #1.
Sealers, carton: Standard-Knapp, Ceco, Triangle, Packomatic.
Sterilizers: Climax 20" x 36" jacketed.
Still, vacuum: 500 gal. stain. steel.
Still, water: Precision 100 GPH.
Tanks: Glass lined, various sizes.
Stain. steel 25 gal. to 1200 gal.
Viscolizer: 150 gal. Cherry-Burrell.

Davenport rotary DRYERS: (2) 3½" dia., 18' long, stainless steel, with stainless steel lifting flights.

Send us your inquiries and list of idle equipment.

LOEB EQUIPMENT SUPPLY CO.

820 West Superior St. — Chicago 22, Ill.
Telephone: Seeley 8-1431 — Our 31st Year

WE HAVE IN STOCK FOR IMMEDIATE DELIVERY THE FOLLOWING TYPES OF EQUIPMENT

BOILERS
CANNING
CONFECTIONERY
DAIRY
FILLERS
MATERIAL HANDLING
STAINLESS STEEL JACKETED KETTLES
MEAT PACKING
MIXERS
MOTORS
PULVERIZERS
PUMPS
REFRIGERATION
SCALES
STAINLESS-STEEL TANKS
LARGE & SMALL STEEL TANKS

Consult Us for Your Food Processing Equipment
Send Us Your Inquiries
We Buy One Item or Entire Plants

AARON Equipment Company
1347 So. Ashland Ave., Chicago 8, Illinois
PHONE: CHesapeake 3-5300

FOR SALE

1,500 gal. Vert. S.S. Tank, side agit.
Frick Evaporative Amm. Condenser, 20 tons.
60 gal. Groen S.S. Clad Jkt. Kettles.
75 gal. Monel Jkt. Kettle, 35" x 27" agit.
100 to 300 gal. S.S. Mix Tanks, water jkt.
225 gal. S.S. Closed Tanks Insul., 38" x 48".
300 gal. Horiz. S.S. Tank, 3' x 7", agit.
650 gal. Horiz. S.S. Tank, 4' x 7'.
5 ft. S.S. Vacuum Pan with accessories.
60" Centrifugal Extractors, type #316 s.s.
20" Centrifugal Extractors, 3 H.P.
36" x 84" & 42" x 120" Double Drum Dryers.
50 to 1,500 gal. Homogenizers or Viscolizers.
3 H.P. Freon Compressor Unit.
3,000 gal. Glass Lined Tanks, Insul.
3—#10BB Waukesha Pumps, 1 H.P.
Milk Pasteprizers, Coolers, Fillers, Washers.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York 17, N. Y.
Murray Hill 2-4616

FMC

TOP QUALITY EQUIPMENT AT LOW REBUILT PRICES

30 Years of Reliability
YOUR BEST GUARANTY

KETTLES
New and used Kettles in Stainless, Nickel, Aluminum, Copper, Steel, Glass Lined, Iron, in all wanted sizes Steam Jacketed or Unjacketed; some with agitators.

TANKS
In Stock at all times STAINLESS STEEL Vertical and Horizontal Tanks, with or without covers; with or without agitators- all sizes:

3413 — Stainless 3500 Gal. Oval (milk truck type) Tank; 6'x4'x22' with 18" manhole and framework.
4168 — Stainless 3200 Gal. Oval (milk truck type) Tank; 4'6"x21' with 18" manhole and 4 cradles.
3762/L18 — Stainless 2120 Gal. Horizontal Tank 60" diameter x 116" long with dished heads and Stainless Agitator.
4019 E1 — A. O. Smith Stainless Lined 20,000 Gal. Pressure Tanks; (1359) 10'x30'; vertical or horizontal use.

VACUUM PANS, COOKERS, EVAPORATORS

3844 — Pfaudler Glass Lined Closed Top Jacketed Vessel 6'x4'.
3824 S 14 — Pfaudler Glass Lined Jacketed Kettle (manhole type) 3'x3'.
3994 K 5 — Monel Closed Top Jacketed and Agitated Vacuum Pan 5'x5'; paddle type agitator with 2 Hp. motor.
4093 B 56 — Stainless Jacketed Agitated Cooker 5'x7' with Evactor and Condenser.
9908 H 3 — Aluminum Jacketed Vacuum Pan 250 gal. 48" Diameter; manhole.
3113 E 2 — Copper coil Heated Vacuum Vessel; 2000 Gal.; 7'x10' 7'.

RETORTS
Always in stock, standard 3 Basket Retorts 40"x72".
3259/64 — Horizontal Retorts 66"x14' long with double track and door opening at each end; steam pipes full length.

All Types of Dryers, Flakers, Rotary and Drum Types; Tray and Truck types either for Vacuum or Atmospheric pressure; Ovens, Crystallizers, Sterilizers, Humidifiers, Air Conditioners, etc.

MIXERS
Large stock on hand of new and Reconditioned Double Ribbon Mixers for Powders, granulars, crystals, etc. from 200 lbs. to 5,000 lbs.

2109 — J. H. Day, Jacketed Double Ribbon Mixer 28"x26"x76"; 175 Gal.
3893 — Readco Jacketed Double Ribbon Mixer; 30"x66"x33"; 210 Gal.
362/G7 — J. H. Day, Jacketed Egg Clipper Mixer; 33"x32"x25".
3961/U2 — Heavy Duty 200 Gal. Dough Mixer; 36"x38"x42"; geared both ends; 10 Hp.

JUICE EXTRACTORS—PULPERS

3971/G1 — Chisholm-Ryder, American Utensil Stainless Model B Juice Extractor.
3300/G1 — Indiana Brush Type Finisher with Stainless Steel Screens.

CUTTERS, CHOPPERS, GRINDERS, ETC.

4017 S 17 — Urschel Model B Dicer-Slicer with 2 Hp.
2936/E1 — Anderson Model No. 4 Dicer with 1 Hp.
3628 D 1 — Cincinnati Meat Grinder 4 ½" Screw with 10 HP motor.
3484/A 33 — Sterling Carborundum Type Potato Peeler with 2 HP motor.

FILLERS

2184, 845 — Berlin Chapman 15 Station Syruper-Filler; up to No. 3's.
3653/M1 — Berlin Chapman 7 Station Stainless Filler; up to No. 10's.
3288/W1 — Horix Stainless 14 Station Gravity-Vacuum Filler up to quarts.

Karl Kiefer Rotary Vacuum Fillers; 12, 16 and 18 Station Machines on hand.

3653/M2 — Ayars Stainless 12 Spout Series C Filler up to 5" dia. containers.
4002/G2 — Pneumatic Scale 16 Spout Automatic Straight Line Filler.

Filler Machine Co. Piston Fillers; 2, 4, 7 and 11 Piston.

7484/A44 — M. & S. 10 Pocket Stainless Steel Fillers.
4011/R1 — M. & S. 6 Pocket Bronze Filler No. 2.
3686/S1 — FMC Hand Pack Filler with 2 Stainless Rotating Tables for 20's and 303 Cans.

Stokes & Smith Auger Type Semi Aut. Powder Fillers Model G up to 5 lbs.

3920 — Stokes & Smith 2 Station Filler Volumetric and Dribble Fill up to 5 lbs.
3673/L34 — Triangle Elec-tri-pak Automatic Weigher-Filler 4 Station Model A4 with conveyor.

CAPPERS

Resina single and double head automatic Cappers; Capem single and double head Cappers; Pneumatic Scale 4 head Capper.

LABELERS

Wrap around Labelers for cans, and round bottles, jars, etc., by Standard-Knapp, Burt, Kyler, Nu-Way, etc.
Spot Labelers by New Jersey Pony Labelrite, Ermold, World—for any size container and label.
Fully Automatic Labelers by World, Pneumatic Sealer and others.

SEND US YOUR INQUIRY
FRED R. FIRSTENBERG, *Pres.*

FIRST MACHINERY CORP.
209-289 Tenth St., Brooklyn 15, N. Y.
ST. 8-4672

FOR SALE

FILTER PRESSES

1—Sperry 36" type EHC-L type 41-44 plates; equipped with electric hydraulic closing device.
Location Jacksonville, Illinois.....$1,250.00 each

4—Sperry 36" type EHC-L 31-41 plates, equiped with electric hydraulic closing device.
Location Jacksonville, Illinois.....$1,000.00 each

3—Sperry 24", 33-36 plates, type 21, solid frames Seco #12 closer size 70 tons simplex closure.
Location Sherman, Texas .....$350.00 each

2—Sperry 30", 41 plate solid frames, electric hydraulic closers.
Location Sherman, Texas .....$650.00 each

Subject to prior sale, f.o.b. shipping point.

MRS. TUCKER'S PRODUCTS

DIV. ANDERSON, CLAYTON & CO.

SHERMAN, TEXAS

FOR SALE

1—Rogers 48" Stainless Steel Vacuum Pan
1—Buflovak #8.5 Stainless Steel Double Effect Evaporator—588 sq. ft.
1—Conkey Triple Effect Evaporator, Herculoy tubes—1900 sq. ft.—UNUSED
1—Goslin Birmingham Quadruple Effect Evaporator, copper tubes—6885 sq. ft.
1—Bowen 5' dia. Stainless Steel Spray Dryer
1—Overton 24" x 60" Double Drum Dryer —UNUSED
1—Niagara #110-20 Stainless Steel Filter, 110 sq. ft.
3—Ammonia Compressors: York 11 x 13; Frick 9 x 9; Frick 8 x 8
2—Triangle G-2-C Elec-Tri-Pak Weighers and Fillers
1—Triangle U-1 Semi-Auto-Auger Filler, non-corrosive
Lot of Power Conveyor in Closed Brewery
2—14,000 gal. Horizontal Glass Lined welded Tanks, A. O. Smith
8—13,500 gal. Pfaudler G. L. Welded Tanks
1—10,500 gal. Horizontal Stainless Steel Tank. UNUSED
1—2500 gal. Glascote Horizontal St. St. Milk Storage Tank
1—2000 gal. Vertical Stainless Steel Tank. UNUSED
1—2000 gal. Vertical T347 Stainless Clad Jacketed Vacuum Receiver
25—Stainless Steel Tanks—30 gal. to 6500 gal.
25—Stainless Steel and Stainless Clad Steam Jacketed Kettles, 40 gal. to 500 gal.
2—Mojonnier Stainless Steel Vacuum Fillers, model 90
1—Hope type 18 Semi-Auto Single Piston Filler, St. St., Rising table, agitated hopper
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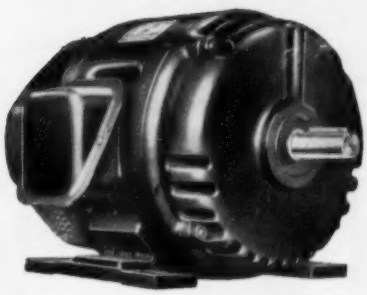

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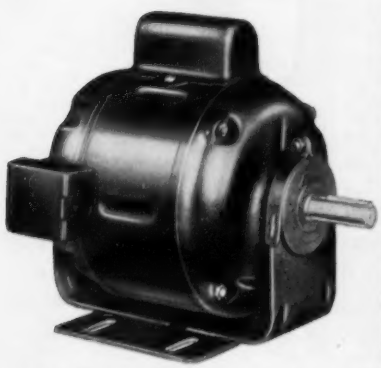

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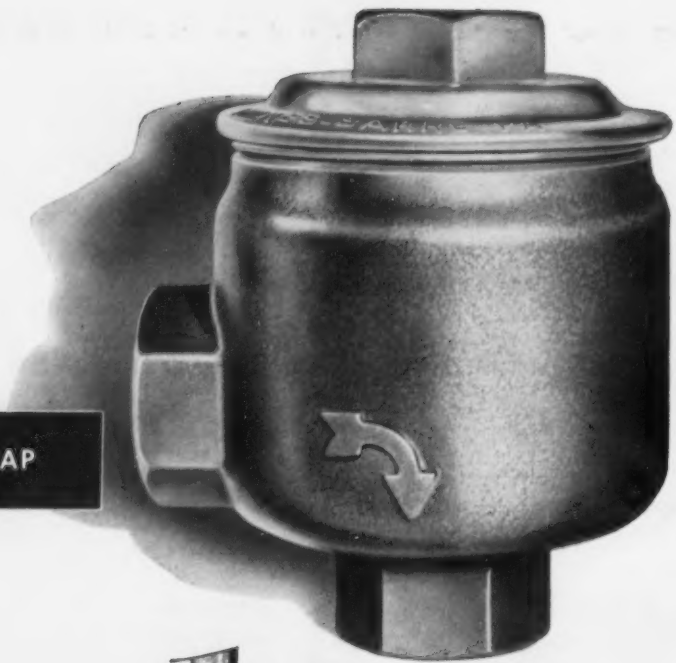

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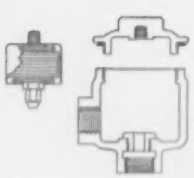

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95G	98B	133B	148A	220A	223C	224B	225C	226C	227D
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95I	98D	135A	152A	220C	223E	224D	225E	226E	227F
95J	98E	135B	155A	220D	223F	224E	225F	226F	227G
95K	99A	135C	159B	220E	223G	224F	225G	226G	227H
96A	99B	135D	156A	220F	223H	224G	225H	226H	227I
96B	99C	137A	156B	220G	223I	224H	225I	226I	227J
96C	99D	137B	156C	220H	223J	224I	225J	226J	227K
96D	99E	137C	156D	220I	223K	224J	225K	226K	227L
96E	129A	138A	156E	220J	223L	224K	225L	226L	227M
96F	129B	139B	156F	220K	223M	224L	225M	226M	227N
97A	130A	139C	182A	220L	223N	224M	225N	226N	227O
97B	130B								

2. TO ENTER SUBSCRIPTION

Use this form. We'll bill you later. →

☐ 1 yr. $2 ☐ 2 yrs. $3 ☐ 3 yrs. $4 Domestic rates only, for others, see p. 5

Product or Service ..... No. Employees In Your Plant .....

3. TO ORDER REPRINTS (P. 194)

Circle numbers, give quantity. We'll bill you →

1	2	3	4	5	6	7
☐	☐	☐	☐	☐	☐	☐

4. TO CHANGE ADDRESS

Print your OLD address here. →

OLD ADDRESS

No. & Street .....

City ..... State .....

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PLEASE TYPE OR PRINT—GIVE COMPLETE INFORMATION

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Position .....Product .....

Company .....

Street .....

City .....State .....

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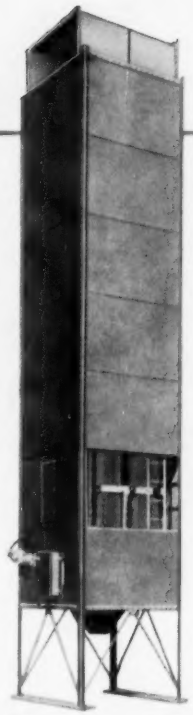
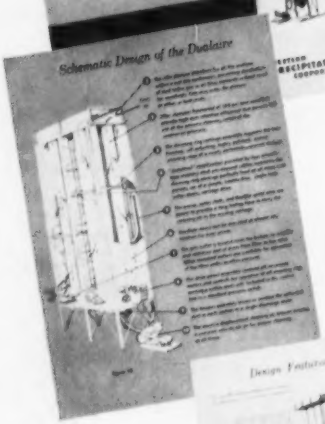


- *Cleans without jarring or rapping!*
- *Maintains uniformly low pressure drop!*
- *Field-proven efficiency as high as 99.99%!*



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CLEANING ACTION starts automatically and stops automatically to keep pressure differential within low pre-set range.

FILTER EFFICIENCY remains uniformly high at all times because no thick filter cake ever forms to reduce operation effectiveness. Actual field tests show efficiencies as high as 99.99%!

NO STANDBY UNITS, with their complicated switching devices, are needed. The DUALAIRE is cleaned as it filters—without interruptions or shut down periods for cleaning. The operation is continuous!

FILTER UNITS LAST LONGER because they are not subjected to intermittent jarring, rapping or vibration—all destructive to filter fabrics.

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